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RAMBLES IN FLORIDA.

BY R. E. C. STEARNS.

Florida, the "Land of Flowers," the enchanted ground wherein it has been said Ponce de Leon sought for the "fountain of perpetual youth," is not far away; the fountain, quite likely, is as remote as ever, but the land which it was said to bless with its everflowing and rejuvenating waters, can be reached after a journey of a few days from New York, by steamship if the traveller is not unpleasantly affected by a sea-voyage, or, if the apprehension of "rough weather off Hattêras" should make a different route preferable, then by rail to Charleston, thence by steamer over waters generally smooth to Fernandina, stopping on the way at Savannah just long enough to look about and obtain a general idea of the place.

Fernandina, situated on Amelia Island, is the principal town upon the east coast of Florida, and of importance, being the eastern terminus of a line of railway which connects the Atlantic Ocean with the Gulf of Mexico. Its population is not far from fifteen hundred. At first sight it is not prepossessing, but a walk about the place reveals many buildings of pleasing architecture hidden among the trees.

Within a small enclosure not far from the landing, "the . . . forefather of the hamlet sleeps." Upon a marble stone may be seen the name of

DOMINGO FERNANDEZ,
NATIVE OF VIGO IN GALLICIA, SPAIN.
BORN THE FOURTH DAY OF AUGUST, 1766.
AND DIED THE THIRD DAY OF SEPTEMBER, 1833.
IN THE SIXTY-SEVENTH YEAR OF HIS AGE.

Señor Fernandez, it is presumed, never found the fabled fountain, or, drinking of its waters they were powerless to avert the inevitable doom of man. The morning was pleasant; the sun shone brightly; it lighted up the cross and gave roundness to the skull and bones that are carved above his name. From an oak near by the Spanish moss hung drooping midway to the ground, casting a filmy shadow, and hiding a choir of mocking-birds,* who filled the air with music.

Leaving the grave of Fernandez and following the streets, a careful search in the loose sand of which they are composed will disclose fragments of pottery of the size of a penny, perhaps a part of the debris of some aboriginal tribe once camped hereabout, the souvenirs of a race, of whose history how little is known!† Farther on is an ancient mound of large size, nearly three hundred yards in circumference. Undisturbed ten years ago its surface was as the builders left it, but its slopes and summit were so changed, through the military purposes for which it was used during the recent civil war, that its original proportions are destroyed, and its former outline obliterated.

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* *Mimus polyglottus* is quite common here; many persons are not aware that this bird has a song of its own, which is very musical and sweet; the popular idea seems to be that its notes are exclusively imitative. In and around Fernandina may frequently be seen, at this season at least (January), the beautiful Ground Dove (*Chamæpelia passerina* Swainson), of which some specimens were obtained.

†"At the landing of Fernandina, on Amelia Island, the summit of the bluff is covered with a layer of artificially deposited shells, extending about two hundred yards upon the bay, and one-fourth of a mile inland, varying in depth from one to four feet. The shells are in many places so rotten as to fall to pieces at the touch, some showing fractures made at the edges as if in opening, while others have obviously been subjected to the action of fire." [D. G. Brinton, M. D., in Smithsonian Report, 1866.

About a mile from the town towards the ocean is the lighthouse, built upon somewhat elevated ground, forming with the adjacent buildings and moss-festooned oaks, a bit of highly picturesque and pleasing scenery.

Between the lighthouse and the road to the beach, not far distant, is another mound in the centre of an ancient camping ground, the latter covered with bleaching shells, the remnants of unrecorded clam-bakes and oyster-feasts. This mound is much smaller than the first, only about one hundred yards in circumference and about fifteen feet in height; it was covered with trees and shrubs,* the largest of the former being perhaps nine inches in diameter; their roots penetrating the loose material of which the mound is composed, and in their ramifications wound and twisted among the skeletons of unknown men whose decayed bones crumbled at a touch. Stone implements were found, and in the surrounding field fragments of earthen-ware less perishable than the hands that made them.

From here to the ocean the path lies through a low and, in some places, dense growth of Saw-palmetto,† interspersed with one or more species of Cactus. The leaf-stalks of the former have sharp points along the edges, hence the name; and the prickly *Cactaceæ* may be considered the porcupines and hedgehogs of the vegetable kingdom. Though painful to the touch and dangerous to the apparel they should not be denounced; many of the *Cacti*, as well as of the *Palmaceæ*, to which family the Saw-palmetto belongs, bear delicious fruit, and some species of Cacti are the feeding parks of the insect,‡ from which the celebrated scarlet dyestuff, known as cochineal, is derived.

* *Xanthoxylum Carolinianum* Lam., or Prickly Ash, also called "toothache tree," is common here. It is said to possess valuable medicinal qualities; a piece of the bark put in the mouth and chewed produces a stinging sensation, causing the tongue to feel as the hand feels after grasping a nettle.

† *Chamærops serrulata.*

‡ *Coccus cacti.* The cochineal of commerce resembles dried berries more than bugs, the *C. cacti* of which it is made are gathered alive, scalded, and then dried. It is estimated that every pound of cochineal contains 70000 of these insects, and from half to three-quarters of a million of pounds are annually sent to Europe.

Without enlarging upon the merits of the Palms and Cacti, which would require a volume, we will consider the species we have encountered as unworthy representatives of noble families, and proceed upon our way.

It is hard work for either man or beast toiling through shifting sands, but pressing on we soon achieve the summit of the mimic mountain range, which the wind and sea always pile up on the landward side of the shore. Descending the slope we are face to face with old ocean, whose majesty, whether in storm or calm, is ever impressive; the sea is smooth, the surf beats gently on the beach. We pause a while to admire the glories of sky and water; to ponder upon the mysteries of life and form that dwell within the broad blue bosom of the deep; to peer into the hazy beauty of the atmosphere which hangs like a curtain at the remote horizon, implying hidden and greater beauty beyond; to note the distant sails of coming or departing ships; or watch the gulls riding upon the ripples like tiny shallops at anchor; to recall how in the north the wintry winds nipped us on New Year's day, only a week or two ago, and how bland and genial are the breezes here; to behold at our feet as we follow the more recent drift-rows, the rejected treasures which the sea has cast aside, forms different from any that we have elsewhere found, and each curious in its way.

There are but few sea-weeds (*algæ*) on the beach, and not many species of shells; of some of the species, however, many individuals can be obtained. Here are numerous specimens of the Fan Mussels (*Pinna*). What is written of the lilies of the field, "they toil not, neither do they spin," does not apply to them; for these submarine weavers spin a byssus, or beard, by which they attach themselves to the bottom of the sea: the byssus serves as a mooring cable, and its fibres are tubular, like human hair. When fresh and flexible, gloves and stockings can be woven from it, and at Tarento it is manufactured into articles of wear "According to Vérany the byssus is a successful remedy

for the earache, but he does not say in what manner it is applied."* *Pinna rudis*, an English species, is sometimes eaten, and Henry and Arthur Adams also mention that some species are used for food.†

A dead fish, half eaten by the birds, is not an attractive object; it is in an unsavory state, but doubtless its scales would, under a microscope, astonish us with many lines of beauty. The butterflies, so unlike the fishes in form and habits, also have minute scales, hence the metallic lustre and brilliancy of their coloring; impalpable to the naked eye, their tiny scales resemble the pollen of flowers. Columbus "gave a new world to Castile and Leon;" but think of the world of enchantment, of the precious treasures that the microscope has opened to all.

A thin slice cut from a spine of the Sea-urchin (*Echinus*) that we have just picked up, if magnified, would furnish a partial insight to the wonders of its plan of structure.

We find the oblong pouch-like egg-cases of a species of Skate (*Raia*) quite common. The texture and color of these pouches are such, that a person not knowing would sooner suppose that in some way they rather belonged to the sea-weeds, perhaps the pod of a species of Alga, than pertaining to the fishes. If we were strolling along the shores of California or Europe we should meet with the same queer forms. In England the people call them "pixy-purses," "fairy-purses," etc. A species of Dog-fish (*Scyllium*) makes a similar purse-like egg-case, with long strings at the corners. The Skate-fishes are eaten in England, and appear in the stalls of the Italian fish-market in San Francisco, the Californian species may generally be found, but they are eaten only by the foreign population. The common English Skate sometimes attains the weight of two hundred pounds; it is used by the fishermen for bait.

*Jeffreys.

†Two species of *Pinna* may be found on the beach of Amelia Island: *P. Carolinensis* Hanley, and *P. squamosissima* Phil.; they are quite common, particularly the former. I do not think they were eaten by the aborigines, as none of the shells, or even fragments, were found in any of the heaps or mounds.

The skates and dog-fishes are not the only marine animals that make curious egg-cases. We have here three species of univalve shells, called by the Floridians, Conchs* (*Busycon*†), which also make egg-cases. Each case is round and flat, about one-half to three-fourths of an inch in diameter, and one-sixth of an inch in thickness; the edge of each flat case is coarsely ribbed or milled, and numbers of them are strung together, only they are immovable upon the string, which is situated upon one side or edge, instead of being central as in a bead necklace. These egg-chains are sometimes two feet in length, and the cases are frequently bored into by different species of carnivorous mollusks to obtain the contents for food. These Conch animals were probably eaten by the aborigines, as we find the shells quite numerous in their Kjœkkenmœddings; they are now sometimes eaten by both the whites and negroes of Florida, but from appearances they must be tough chewing, and as indigestible as a rubber boot.

At the edge of the beach, rolling in the surf-ripples, a large fleet of Ark shells is coming ashore; these prettily ribbed bivalves look like the Cockles (*Cardium*), but the animal and the hinge are quite different. The velvety epidermis which generally covers the surface has been worn off by the friction of sand and water in the surf, exposing the clean white fabric of the shells; lighted by the sun they look like a squadron of little dismasted hulls. Two of the three species that we have here obtained are widely distributed, and may be picked up near Galveston, on the Gulf of Mexico. Some of the family may be found in every sea, and many species are used for food. The animal of *Arca grandis*, which is found in the Bay of Panama, is eaten by the natives; a single valve of this giant Ark

* Indiscriminately used when reference is made to any species of the Pyrulidæ, Strombidæ, Fasciolaridæ, etc., found here.

† *B. canaliculatum* and *B. carica* of Linnæus, also collected by me as far north as New Bedford, and *B. gibbosum* of Conrad, the latter considered by many as only a variety of *carica*, but showing well marked peculiarities.

sometimes weighs two and a quarter pounds. Odd valves of the Ark shells are found in the shellheaps, but are not common.

A mile and a half from where the road enters the beach are the remains of two wrecks; the planking of the decks and sides has long ago been broken up and swept away by the sea, and the timbers projecting from the sands resemble the ribs of some gigantic mammal. No vestige of name is left; their wooden skeletons tell of fierce storms, when wind and waves, acting in unison, hurled ships and shells, and sea-weeds, like weightless bubbles, upon the beach. A wreck is a sad sight, but the crevices of an old hulk are a fine field for the naturalist, for many forms of marine life have a home therein. Here we found a tiny species of Mussel (*Mytilus cubitus*), and a new species of *Siphonaria*, a univalve shell shaped like a small shield, with elevated lines or ribs radiating from centre to circumference.

Without farther enumerating or explaining the prizes that are ours through the bounty of old ocean, we must retrace our steps towards the road, for the sun has so nearly set that its level rays are shining in our eyes. With baskets and pockets packed and full we jog along, stopping occasionally to pick up a fine specimen of a white bivalve shell, *Dosinia discus*, which is very abundant, thanks to a storm which threw them high and dry above the reach of ordinary tides. The Fish-crows (*Corvus ossifragus*) and a large species of Blackbird (*Quiscalus baritus*) are running over the wet sands, stooping sometimes to pick up some tit-bit for their suppers. Bidding them good-bye, we hurry on, and after a weary walk of what seemed many miles, made longer by the toilsome tug through sand and chapparal, we reach our haven; tired as dogs (at times are said to be) we gladly cast aside our packs, and after a refreshing wash, rush to supper with appetites as keen as hungry wolves!

The evenings here are chilly, and a fire of the Pitch-pine wood (*Pinus palustris* Linn.) is pleasant, aside from the

warmth, for its bright flames fill the room with a cheerful light. . . . . How glorious is sleep after a day of toil; of toil, yet still of pleasure. How gently it descends upon us, how quietly we yield to its embrace; it touches the drowsy eye, and we feel that

> "The day is done, and the darkness
> Falls from the wing of night."

MONSTROSITIES AMONG TROUT.

BY A. COOLIDGE, M. D.

The egg of a fish consists of an enveloping membrane containing the yolk or vitellus. The first step in the development of the egg is the formation of innumerable cells on the surface of the vitellus, which are closely packed together, and form a new membrane or layer surrounding the vitellus. The next sign of organization is the thickening and condensation of one spot of this new layer. The thickened part has an elongated oval shape, and in its centre, running longitudinally, is a delicate line or furrow.

This is the first beginning of the fish. The backbone of the fish is formed around this furrow. The anterior extremity spreads to become the cavity of the brain, and the tail grows from the posterior end. The yolk remains enclosed in the new layer as in a sac; as the fish grows this sac becomes constricted, so that the upper part of it is taken up into the body of the fish, while the lower part remains hanging out, and is called the umbilical vesicle, and it is in this condition that the fish is hatched. He is attached to the upper part of the umbilical vesicle, which being too heavy for him to move, he remains anchored by it, as it were, at the bottom of the stream, wriggling only his head and tail. The fish is fed by the absorption of the contents of the vesi-

cle which decreases every day as he grows larger. After some days he is large enough to swim about with the vesicle under him, and at the end of forty to fifty days the sac is no longer to be seen, and the fish swims freely about.

All fish, however, are not perfect and oftentimes deformed ones are met with. Sometimes, instead of there being one fish only attached to an umbilical vesicle, there are two; not two separate ones, but two heads attached to one body, or two bodies attached to one tail, as shown in Figs. 47 and 48. This curious partial duplication of the fish takes place in the egg long before it is hatched, and is due, probably, to a bifurcation of the furrow around which the backbone of the fish is formed. The cells of the thickened oval spot, instead of forming one straight furrow, for some reason or other form one in the shape of a Y. Two backbones form around the two branches, with two heads, while one tail has to do for both.

Fig. 47. Fig. 48.

As far as has been observed it is always the anterior part which is duplicated. No one body with two tails has been found. The tail remains single while the head and body are doubled; and this duplication varies from a partial division of the head only to two nearly complete fish, with different brains, and hearts, and stomachs, and whose hearts do not even beat together, though the circulation in the tail must be common to both. On the other hand the head alone may show signs of duplication. One young fish was found in whom this had extended only to the partial division of the head. Of the four eyes the two middle ones were not completely separated; they looked something like a figure of 8 on its side. Generally one of the half fish is larger and stronger than the other, as seen in Fig. 48, and carries the smaller one off wherever it will, notwithstanding the apparent effort of the smaller one to go somewhere else.

These double fish are not very common, and as they die after the vitelline sac has been absorbed they are not seen by fishermen. The ratio of these deformed fish to the number of eggs in the hatching troughs was roughly estimated at twenty to twenty thousand, or one in a thousand eggs.

But a curious fact proved that the eggs of some fish contained a larger proportion. One large blind trout had a small pond to herself, and was fed daily by food presented to her on the end of a stick. Her eggs were kept apart, and out of about two thousand there were sixteen deformed fish, or one to one hundred and twenty-five eggs. Certain fish would seem to be more predisposed to produce eggs creating these monstrosities, and were we to ask for the cause of this, we should probably have to look for it in some anomaly of the ovary of the fish which produces the eggs.

A deformity more common than the double fish is an apparent curvature of the spine. The fish instead of being straight, with the umbilical vesicle under him, is curved round so that its tail turns under, and sometimes touches the under surface of the sac he is attached to. Fig. 49 represents one of these semicircular fish. They are obliged to swim on their side, and move round and round in a circle, or in a spiral, without being able to go straight.

Fig. 49.

These deformities are mentioned and treated by Buckland in his "Fish Hatching." He there suggests that humpbacked deformity may have been caused by pressure during their "transport in the egg state." In the instances mentioned above, however, there was no transport, the ova being taken from the fish on the spot.

Out of two thousand salmon ova hatched at Messrs. Dexter & Co's fish-farm, there were no deformities, but in another lot of about the same number there were two double-headed specimens just hatched out.

THE COW BLACKBIRD.

BY T. MARTIN TRIPPE.

PARASITIC animals are, for the most part, confined to the lower grades of life. Among the Articulates they constitute whole groups; they are less numerous in the Radiates and Mollusca, and when we arrive at the Vertebrata we find very few animals of this nature. As a general rule, the parasitism in these higher types is less complete than in the lower species. Of parasitic birds there are very few examples, North America possessing but a single species, the well-known *Molothrus pecoris*, whose history we shall briefly sketch.

The Cow-bird, as it is generally called, is spread over the whole continent, from the Atlantic to the Pacific, and from Mexico to Hudson's Bay. It winters in the Southern States, from Virginia southward into Mexico, frequenting the old corn and rice fields, or gathering in small flocks around the cattle in pastures. About the middle of March it begins to appear in the neighborhood of New York, at first only a few appearing in company with the Red-winged and Crow Blackbirds, but by the end of March or beginning of April, as soon as the spring becomes somewhat settled, they become abundant. They are now seen in numerous small flocks of from five to twenty, of which the females comprise at least two-thirds. These small flocks, or parties, continue in the neighborhood of New York until about the middle or end of June, according to the season, after which time none are seen except, perhaps, a female or two. Towards the early part of September they reappear in numerous flocks of from fifty to five hundred individuals, or even more. They now scatter themselves over the fields, frequenting for the greater part of the time the pastures, where they feed upon the swarms of insects that are constantly to be found in the

vicinity of herds of cattle. Later in the fall they sometimes associate with the Red-wings, which have now also gathered into flocks. About the middle of October they leave us for the South.

Like the European Cuckoo, the Cow Blackbird lays its eggs in the nests of other birds, never building one for itself. It usually selects the nest of a bird smaller than itself, and never forcibly drives away the rightful owners in order to take possession itself, but waits until they are absent, and then secretly and quickly deposits the egg. Among the birds who are thus victimized are the Red-eyed and White-eyed Vireos, the Maryland Yellow-throat, the Bluebird, Indigo-bird, Chipping and Song Sparrows, Yellow Warbler, Golden-crowned, Wilson's, and Wood Thrushes, Blue-gray Flycatcher, Yellowbird, Towhee Bunting, Black and White Creeper, Purple Finch and Bay-winged Bunting. The favorites are the Maryland Yellow-throat, the summer Yellowbird, and the Vireos.

The egg of the Cow Blackbird is of a dirty white, thickly sprinkled with spots and dashes of reddish brown. Some of these spots are darker than others, and different eggs often show some slight variations in color, as is generally the case, indeed, with all streaked and spotted eggs.

One egg is the most ordinary number in the same nest, but occasionally there are two, one of which, Audubon observes, usually proves addled. I never heard of more than two instances where there were more than two eggs of the Cow-bird in a single nest. Prof. Baird and Dr. Brewer once found three eggs in a nest of the Black and White Creeper, and I once had the good fortune to discover a nest of the same bird containing five eggs of the parasite, together with three of her own. In the latter case, incubation had begun, and all of the eggs contained embryos.

The young Cow Bunting usually breaks the shell a short time before the other occupants of the nest, who, from this circumstance, and the fact that they are smaller and weaker

than their intruding nest-mate, almost always perish. In the latter part of May, and during June, the young Cow-birds may be seen flitting through the woods and orchards; but at this time of the year they do not frequent the open fields as the adult birds do. They do not entirely disappear until July, when most of the small birds have raised their first broods. In September they return in flocks along with the old birds. They do not attain their full plumage until the following spring.

It is not often that the Cow-bird lays her egg in an empty nest, but I have known of one or two instances of the kind. In such cases the owner always, as far as I can learn, deserts her nest. But if, as is almost always the case, she has laid one or two eggs before the parasite has deposited her's, she will generally remain, though often with apparent reluctance. Some birds, however, will often desert their nests even if they have laid in them first, as the Song Sparrow and Wood Thrush. At times some birds show great ingenuity in getting rid of the intruding egg, by building a second floor to the nest, above the egg, thus completely covering it up. The Yellow Warbler, a frequent victim of the Bunting, often adopts this method of freeing herself from the annoying parasite; and I have known the Song Sparrow to adopt the same plan. An instance is on record in which a Yellow Warbler, having built a second floor to her nest over an egg of the Cow-bird, found another egg of the same bird laid upon her second story, whereupon she went to work again and built a third floor over the second egg. I have known the Cow Bunting to lay her egg on the second story of a nest, but the bird, in this instance, deserted her nest.

The notes of the Cow Blackbird are not many in number, nor musical in tone. When flying, the male utters a whistling sort of note, composed of two syllables. At other times, when perched upon a tree, he utters his love-song, which is composed of two loud preliminary notes, which

Nuttall compares to the syllables "gluck tsee," followed by a medley of low gurgling notes. On a warm morning in April the males will sit upon the tops of the maple and apple trees in the pastures and orchards for an hour at a time, repeating at short intervals their jingling notes, to the intense satisfaction, apparently, of themselves and their numerous mates who sit around them in admiring circles. While uttering these notes the bird struts and swells like a turkey-cock, and with the same intention—the desire of pleasing his mates.

The food of the Cow Blackbird consists principally of insects, especially flies, grubs, beetles, etc. They eat also the seeds of various plants, and at times join the Red-winged and Crow Blackbirds in plundering the cornfields; but the injury that they thus inflict is very slight, and is far more than overbalanced by the good they do in devouring vast numbers of noxious insects. Hence they deserve the protection of the farmer; but as they are often found in suspicious company, viz., with Crows and Red-winged Blackbirds, they frequently suffer the penalty of associating with proscribed thieves and rogues, by being shot down with them.

NOTES ON THE FAUNA OF THE UPPER MISSOURI.

BY J. G. COOPER, M. D.

In May, eight years since, I was attached to a military expedition on its way to the Pacific Coast, via the Missouri and Columbia Rivers, which had just been connected by a military road constructed by Capt. John Mullan, U. S. A. It was chiefly for the purpose of trying its practicability that the party of about two hundred and fifty men and several officers, under the command of Major G. M. Blake, was sent by this new route instead of by the Isthmus of Panama.

Of the two months spent in ascending the Missouri to Fort Benton by steamboat, I will not write very fully, although the tediousness of the trip was enlivened by many interesting scenes, and by observations and collections of numerous specimens of small mammals, birds and eggs. These I packed and directed to the Smithsonian Institution, but they were never received there; the eggs were all collected west of Fort Union. I will briefly enumerate the species for the benefit of future collectors and students of the summer range of our birds. The valley of the Missouri, along that portion, is usually bordered by low trees and shrubbery in the bottom land, while the uplands are quite bare, or only a few stunted trees occur where springs issue from the bluffs.

June 17th, I found the nest and eggs of *Empidonax pusillus* (probably), on a low tree in a dense dark thicket, built in a sharp crotch; 18th, the nest of the Western Red-tailed Hawk (*Buteo montanus*), with two eggs partly hatched, on a small oak at a distance from the river; also, two eggs of the Dove (*Zenaidura Carolinensis*), and one, said to be that of an eagle (?), were brought in by the men. The Wild Pigeon (*Ectopistes migratoria*) also breeds here. I found the nest and four eggs of the Lark Finch (*Chondestes grammaca*), situated as usual on the ground, and one of some uncertain sparrow. The next day I obtained that of the Shrike (*Collyrio excubitoroides*), with six eggs; and one of the Shore Lark (*Eremophila cornuta*).

A leak having opened in the boiler we were delayed near this place the third day also, and I found it a perfect nursery of birds, the shrubbery on the north bank being full of them and their nests. I obtained there also eight nests of the Redstart (*Setophaga ruticilla*), with eggs; that of the Chat (*Icteria viridis*), with four eggs; of the Black-headed Grosbeak (*Guiraca melanocephala*); of some small Thrush (*Turdus Swainsonii?*); of the Cat Bird (*Mimus Carolinensis*), and two of the Chippy (*Spizella socialis*). I

saw also species of Vireo, (*Pipilo arcticus?*), *Dendroica æstiva*, *Colaptes* (*auratus?*), *Geothypis trichas*, and *Certhia Americana*, which, probably, had nests near there. The locality is about fifty miles by the river west of Fort Union.

The absence of shrubbery, except close to the river, confines most of the small birds to a narrow range, and makes it easy to find their nests, none of the trees being large. It will be noticed that at least two species peculiar to the western half of the continent breed so far east, and it is possible that the Empidonax, Pipilo and Colaptes, were also of the western types. The rocky bluffs which border the river above the Great Bend, and are often high enough to appear like mountains, although only the escarpment of the Great Plains, apparently favor an extension eastward of the Mountain fauna to this point; the Mountain Sheep (*Ovis montana*), Woodrat (*Neotoma cinerea*), and perhaps other mammals coming down in company with the birds, etc. At the same time it is remarkable that all the eastern birds mentioned *extend in this latitude* entirely across the Rocky Mountains, though most of them do not even reach the mountains northward, and seem, therefore, to follow the Missouri River westward, in their spring migrations.

On June 22nd I obtained eggs of the Brown Thrush (*Harporhynchus rufus*) which is common to the Rocky Mountains. I noticed some species of Swift (Chætura?) with a white throat, but too high to shoot. We reached the north of Milk River, where large herds of buffalo were passing towards the South, very few having been seen below that point. That pretty and musical bird of the high plains, the Lark Bunting (*Calamospiza bicolor*), also occurred near there, and extends east to Fort Union.

The bluffs from Milk River to Fort Benton are higher and more rugged, with groves of coniferous and other trees at intervals, being spurs of the Black Hills, which form the first range of the Rocky Mountains. I had little opportunity for collecting along this interesting portion of the

route, and obtained only the eggs of some unknown warbler; of a Pipilo; of the Robin (*Turdus migratorius*), which had its nest built in a split trunk of a fallen tree; eight eggs of the Rock Wren (*Salpinctes obsoletus*), found in a log-house which was torn down for fuel; two nests and nine eggs of the Shore Lark (*Eremophila cornuta*); and one of a Night-hawk, probably *Chordeiles Henryi*, which I found on the bare gravelly bluff. I noticed here the first Magpies (*Pica Hudsonica*) and a strange Woodpecker.

Arriving at Fort Benton July 2nd, we remained in camp there until August 7th, and this being the worst season for collecting specimens I obtained but few. The country near the fort is also too flat and bare to be productive of a great variety of animals, being exactly in the middle of the wide valley lying between the Black Hills and Rocky Mountains, while there are few trees or bushes along the river. The river, however, furnishes quite a variety of fish, including Pike (Esox sp.), Catfish (*Pimelodus olivaceus* and *Noturus flavus*), Pike Perch (*Stizostedion boreus*), Grunter (*Amblodon grunniens*), Carp (*Carpiodes damalis*), and several other Cyprinoids which furnish much sport, and some of them good eating. Dr. Hayden's "Report of Explorations in Nebraska," for 1859, gives full lists of these and other animals found by him during several years collecting in this region.

At and above the Great Falls, thirty miles higher up the river, we also found trout abundant (*Salmo Lewisii*), and also a *Coregonus*, and other species of fishes apparently new. It is somewhat singular that the fresh-water Mollusca which I found here were all different species from any obtained by Dr. Hayden in the lower parts of the Missouri and its branches, except *Unio luteolus* and *Physa heterostropha*, the rest being *Limnæa palustris*, *bulimoides* and *desidiosa*, *Sphærium striatinum*, *Margaritana* (*margaritifera var?*) *falcata*, while Dr. Hayden obtained thirty other species in Nebraska. The above, also, are nearly all found west of the Rocky Mountains, or represented there by closely allied

species, and one or two are circumboreal. (See Annals of the New York Lyceum, Vol. vii.)

I do not undertake here to enumerate nearly all the species of animals seen or collected, as Dr. Hayden has made a much fuller collection of them than I could do in so hasty a journey.

Rattlesnakes (*Crotalus confluentus?*), some small Lizards (*Sceloporus* and *Plestiodon*), and the curious Horned Toad (*Phrynosoma Douglassii*) were all the reptiles observed in this dry season, though several others doubtless occur in spring.

Young Curlews (*Numenius longirostris*) and Field Plovers (*Actiturus Bartramius*) were common on the plains. The Mountain Plover (*Ægialitus montanus*) appears on the driest plains among the villages of the Prairie-dog (*Cynomys Ludovicianus*). I also shot some immature Buntings (Plectrophanes), of which three species are found in Nebraska, and confined to the Great Plains east of the Rocky Mountains.

Near Sun River, which is a clear swift mountain stream, I observed some middle-sized Squirrels (*Spermophilus Franklinii?*), but they were so exceedingly shy that I did not succeed in getting any. Here the Rocky Mountains became fully visible, and mountain trees line the banks of the river. I noticed here the first of Lewis' Woodpecker (*Melanerpes torquatus*), which never leaves the neighborhood of the mountains. On the east side of the Missouri high ranges are also visible, and the road now commences to ascend over rolling and often rocky hills, with pine woods on the higher parts. August 13th two eggs of the Night-hawk were found nearly hatched, laid as usual on the bare ground. At the mouth of Prickly-pear Creek the Dusky Grouse (*Tetrao obscurus*) was first found, in company with the prairie-loving Sharp-tail (*Pediœcetes phasianellus*), which we had found all along the Missouri River.

Going up the valley of this creek we passed over high and thickly wooded ridges, where I saw Clarke's Crow

(*Picicorvus Columbianus*), the Clay-colored Sparrow (*Spizella pallida*), and obtained a specimen of the long-tailed Chickadee (*Parus septentrionalis* var? *albescens* Baird). The Red Crossbill (*Curvirostra Americana*) and Pigmy Nuthatch (*Sitta pygmæa*) were also common, with other species which scarcely ever leave the mountain forests. August 17th we encamped only three miles from the summit of Mullan's Pass, and nearly six thousand feet above the sea, where I observed a large Marmot (*Arctomys flaviventer*) and a Weasel (*Putorius longicauda?*). I also shot the first Oregon Grouse (*Bonasa Sabinii*), and saw MacGillivray's Warbler (*Geothlypis MacGillivrayi*).

THE LILIES OF THE FIELDS, OF THE ROCKS, AND OF THE CLOUDS.

BY PROF. G. HINRICHS.

"Consider the lilies of the field,—even Solomon in all his glory was not arrayed like one of these!"

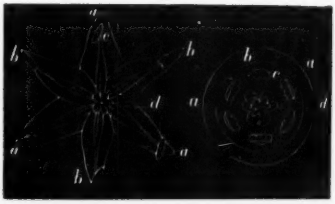
THESE beautiful words and their promise are familiar to all of us; but we are perhaps less conversant with the beauty of form here referred to. The season of flowers is now with us; we have, therefor, each and all, abundant opportunity to consider or behold the plants in their own glory. A few words of explanation, and a few examples from the world of flowers may, perhaps, be an additional incentive to look upon the flowers themselves; and it may also prove interesting to show that there are objects deeply buried in the rocks, and also high up in the sky, which contain the same essential elements of beauty so much admired in the lilies of the field.

To the botanist the lilies comprehend a very large group of plants. A great number are distinguished for the brilliancy of their colors; as the numerous tulip-varieties and

the lilies proper. The lily of the valley (Fig. 50) is of a pure white; hence its beauty cannot be sought in its color, but must principally be due to its peculiar form. In the lily family the form of the flower is perfectly regular; the three leaves of the calyx are succeeded by three leaves of the corolla; then follow the six stamens, and in the centre of the flower we find the three pistils. These parts may be very easily recognized in the figure of the open flower and the bud of *Scilla* here added (Fig. 51).

Fig. 50.

Fig. 51.



In the Iris family—of which a section of the flower, bud and pod is illustrative—we notice also that the parts are all threefold; here, even the stamens are three in number, and not six as in the lilies. A like symmetry and regularity of flower is exhibited by many large trees, as the Date-palm (Fig. 52), the leaves of which are the *Palms* of Scripture; and even microscopic parts of the flower, like the pollen grains, often show a similar regularity. (Fig. 53.)

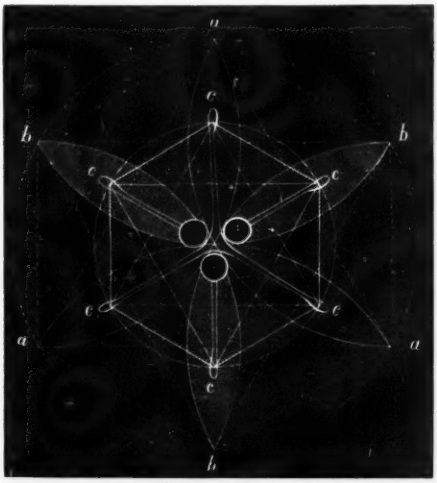
Fig. 52.

Fig. 53.

That color cannot be the most important element of the beauty of these flowers, we may conclude from the fact that even the imperfect uncolored figures here given are not destitute of beauty. Again, the form of the petals is as changing as their color; so that the particular form of any of the parts of these flowers cannot either be considered as the most essential

element of their beauty. We conclude, then, that the form or *plan of the flower*, which is the same in all, is the element which above all others influences the beauty of these objects. This plan is here represented in a diagram (Fig. 54) wherein the leaves of the calyx are marked *a;* those of the corolla, *b;* the stamens, *c;* and the pistils, *d*. In this diagram the perfect *regularity* of these flowers is more easily noticed than in the drawings of the different flowers themselves; for the diagram is the flower stripped of all its specific peculiarities superposed and ingrafted upon the general plan. We see from this diagram better still than from the figure of Scilla, that the calyx does not merely consist of three equal leaves, but that they are so placed around the axis, or stalk of the flower, that they, two and two, include the same angle between them, so as to produce a triangle (*a*, *a*, *a*), the sides of which are of equal length; such a triangle is called an *equilateral* one. The same is true in regard to the next series of three leaves, *b*, *b*, *b*, constituting the corolla of the flower; but not only do the calyx and the corolla form equilateral triangles but they are so placed that the leaves of the one fall exactly midways between those of the other. If the calyx be represented by a triangle, with its vertex upward, the corolla will be a triangle with the vertex downward. But both triangles, on account of this peculiar relative position, perfectly

Fig. 54.



harmonize with one another, so as to produce a new regular form embracing them both as simply equal halves; this more general form is the regular hexagon (six-sided figure), *a b*, *a b*, *a b*, in the diagram. The reality of this hexagon is in the lilies represented by the six equal stamens, *c*. Finally, inside of these we have the pistils, three in number, corresponding in position with the corolla.

The regular hexagon, or simpler the equilateral triangle, thus constitutes the foundation of the beauty of the lilies; the form of the petals and the shape of the other parts, as well as the colors, are merely accessories, capable of heightening the beauty of the flower, but not necessary to it.

The six figures of snow-crystals (Fig. 55), selected from about two hundred different forms observed by Mr. Franke,

Fig. 55.

in Dresden, Saxony, in 1845–46, and published in the transactions of the society "Isis" of that city, show that the snow-crystal may rightly be termed the "lily of the sky." The first of the snow-crystals here given is almost identical with the hexagon, formed jointly by the calyx and corolla of many a lily of the field, while the second snow-crystal presents the same appearance as the six stamens of the lily. Just compare these snow-crystals with the figures of Scilla or the general diagram of the lily-flower!

The snow-crystals in the annexed figure (Fig. 56) are more common. Many of these forms may be observed on any calm winter day, when the snow falls slowly in a cold atmosphere. The lower pennate form —also taken from the plates of Franke —is particularly interesting, for it shows the six-sided star as made up of two triangular halves, the one corresponding to the corolla, the other to the calyx (outer star) of the lilies. In this same group of snow-crystals we have also three more compact forms, showing not merely the hexagonal star, principally represented by its six rays, but having the whole ground more completely filled up so as to form a regular six-sided plate. Between these and the "lilies of the rocks," the crystals found in caves and crevices deep in the earth, there is no essential difference. Compare the figure of the Emerald (Fig. 57), particularly the lower figure representing a Russian emerald, as seen from

Fig. 56.

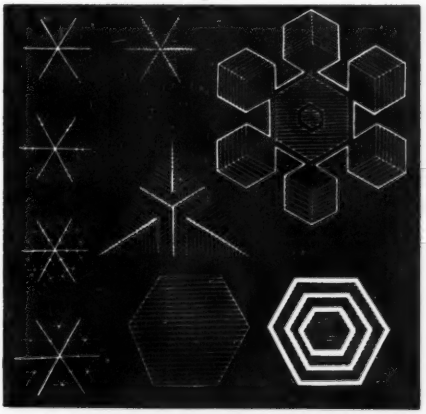
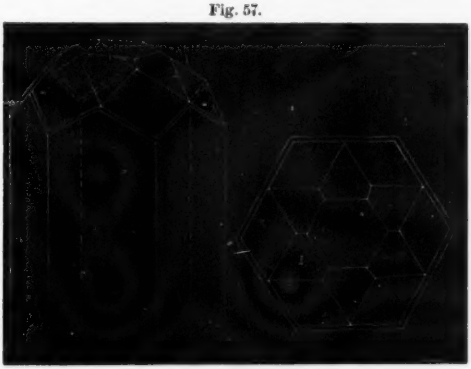
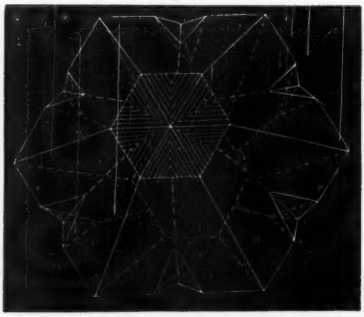


Fig. 57.



above, with the tabular snow-crystals just referred to! It exhibits first the regular hexagonal form in its outline, and also the two regular triangles corresponding as it were to the leaves of calyx and corolla in the lilies of the field! The emerald, therefore, is built upon the same fundamental plan on which the temple of beauty is erected in the lily; but the material, though beautiful, apparently did not admit of the graceful windings exhibited in the more yielding, but also less permanent body of the lily of the field. The emerald possesses all the beauty of form and color which can be expressed by uniformity of material; and if the lily of the field surpasses the emerald in graceful modification of these forms, and in variety of color, it lacks the lustre of the emerald, and even in this very variety carries the germ of speedy decay. There are many substances, which in their crystalline form exhibit the same trinity characteristic of the lily, the snow-star and the emerald. The well-known quartz, or rock-crystal, exhibits this form, and so does the beautiful mineral Alexandrite, represented in Fig. 58. This mineral was discovered in the Russian emerald diggings, on the very day on which the present emperor Alexander became of age. It has furthermore the remarkable peculiarity of appearing of a very beautiful green during the day, while in the evening (that is by lamp or gas-light) it appears of a pure red color; but red and green are the Russian colors. Hence the new mineral was named Alexandrite.

Fig. 58.



Even in the animal frame several structures have been discovered built upon the same principle, particularly the microscopic structure of the retina in the human eye. According to the discovery of the Danish microscopist, Dr.

Hannover, the interior of the eye is as if paved with very minute hexagonal blocks, put closely side by side. So also the plates covering many aquatic animals, particularly the body of many fossil crinoids, excellent figures of which may be found in the geological reports of the great American palæontologist, James Hall, of Albany. I add the figure of one plate from *Archæocidaris Agassizi*. (Fig. 59.)

Fig. 59.

It is evident from the few examples selected from among thousands, that the regular hexagonal form, or the division of the circle into three or six equal parts is a grand natural fact, alike manifest in the inorganic and organic world; this same fact is the glory and beauty of the lilies of the field, the lilies of the rocks, and the lilies of the sky.

So general a fact must be the consequence of a general law, and although this law may be deeply hidden in the mysteries of the vegetable and animal life exhibiting these forms, it may be more accessible in the lilies of inorganic, or so called inanimate nature. The question as to the cause of the form of the lily of the field may be premature, but may we not ask physical science for the cause of the form of the crystals of the rocks and of the sky? Or, to make the question still more precise, may we not ask the physicist, chemist and mineralogist—who each and every one are investigating these subjects—for the explanation of the wonderful form of the snow-crystal? That there is a cause for this form is manifest to every one who even merely glances at a few snow-crystals occasionally caught on our clothing on a winter's day; but as yet science has not been able to unravel the mysterious origin of the crystalline forms which adorn every nook and corner in the material world, and which we see forming under our very eyes in the laboratory of the chemist.

In my work called "Atomechanics, or Chemistry a Mechanics of the Panatoms," published in 1867, and distributed

among the scientific institutions at home and abroad, this question appears to be solved simply and completely. It is to be hoped that the intellectual inertia, always to be overcome by new and startling ideas, however plain and well founded, may not seriously retard the spreading of the answer to the question here raised: How is a snow-crystal built?

We cannot conclude this little sketch with more appropriate words than the description of the snow-crystal given by Prof. Tyndall, in his fourth lecture of the admirable work, "Heat as a mode of motion." The great philosopher of the Royal Institution says:

"Snow, perfectly formed, is not an irregular aggregate of ice-particles; in a calm atmosphere the aqueous atoms arrange themselves so as to form the most exquisite figures. [See the figures given in the preceding parts of this article.] The snow-crystals formed in a calm atmosphere are built upon the same type: the molecules arrange themselves to form hexagonal stars. From a central nucleus shoot six spiculæ, every two of which are separated by an angle of 60°. From these central ribs smaller spiculæ shoot right and left, with unerring fidelity to the angle 60°, and from these again other smaller ones diverge at the same angle. The six-leaved blossoms assume the most wonderful variety of form; their tracery is of the finest frozen gauze, and round about their corners other rosettes of smaller dimensions often cling. Beauty is superposed upon beauty, as if nature once committed to her task took delight in showing, even within the narrowest limits, the wealth of her resources."

ON THE PRESERVATION OF ENTOMOLOGICAL CABINETS.

BY JOHN L. LECONTE, M. D.

I HAVE tried at various times many experiments for the preservation of collections of insects, but with such limited success that I did not think the results obtained worth publishing. For the sake of deterring others from pursuing these different lines of unsuccessful attempts, it would be useful, perhaps, to give a brief account of my failures before describing a process recently devised, which seems to be both simple and effective.

Corrosive sublimate and various preparations of arsenic have been recommended by several high authorities. The former, even when most diluted, will finally render the pin brittle by the amalgam developed; the latter, when used in a very weak alcoholic solution so as to leave no efflorescence on the specimens, will preserve them well, but is troublesome to apply, as the insects must be thoroughly soaked with the fluid before being placed in the cabinet. Binarseniate of potassa being deliquescent, suggested itself to me as a material that might be applied in greater strength, and many years ago I prepared two boxes of specimens with it. They had a good appearance for some time, and have never been attacked, but eventually a considerable deposit or efflorescence came on the surface, so that the specimens required cleaning before they could be used for study.

Painting the interior of the boxes with arsenious acid was also only partially successful; I have seen, though not often, living larvæ of *Trogoderma* in boxes thus prepared.

Having thus failed in finding any satisfactory mineral poison I then tried the vegetable alkaloids.

I soaked specimens in moderately strong alcoholic solutions of strychnia and picrotoxia, dried them, and put them

into pill boxes with *Trogoderma* larvæ. After some weeks the specimens were partly eaten, and the larvæ transformed into perfect insects.

The effects of benzine and carbolic acid are powerful, but only temporary. The former is preferable on account of its less disagreeable odor, and may be used by pouring about a teaspoonful in each box; it must be renewed every four or five months.

Packing the collection in chests painted with coal-tar has been also recommended, and would certainly be efficient, but troublesome, and renders the collection, practically, nearly useless for study on account of the difficulty of access to the boxes. Surgical art has, however, given to us an instrument by which a poisonous liquid can be rapidly and most effectively applied to the entire surface of large numbers of specimens as they stand in the cabinet boxes, without the trouble of moving them. I refer to the *Atomizer*.

Opinions may vary as to the nature of the liquid poison to be used, but after several trials I have found the following formula to be quite satisfactory; it produces no efflorescence, even on the most highly polished species, while the odor is quite strong, and persistent enough to destroy any larvæ or eggs that may be already in the box:—

Saturated alcoholic solution of arsenious acid, eight fluid ounces; Strychnine, twelve grains; Crystallized carbolic acid, one drachm; Mineral naphtha (or heavy benzine) and strong alcohol, enough to make one quart.

I have not stated the quantity of naphtha, since there are some varieties of light petroleum in commerce which dissolve in alcohol only to a slight extent. These should not be used. The heavier oils which mix indefinitely with alcohol are the proper ones, and for the two pints of mixture ten to twelve fluid ounces of the naphtha will be sufficient.

Care should be taken to test the naphtha on a piece of paper. If it leaves a greasy stain which does not disappear after a few hours, it is not suitable for this purpose.

The best form of atomizer is the long, plated, reversible tube; it should be worked with a gum elastic pipe, having two bulbs to secure uniformity in the current. The atomizing glass tubes and the bottle which usually accompany the apparatus are unnecessary: a common narrow-necked two ounce bottle will serve perfectly to hold the fluid.

I trust that the use of the means here indicated may render the preservation of insect collections less troublesome than heretofore, and thus increase the interest of amateurs who frequently become disgusted with the science of entomology, by seeing the results of years of active and intelligent labor destroyed by a few months of inattention, or by carelessness in introducing infected specimens.

A TRUE STORY OF A PET BIRD.*

BY ROBERT RIDGEWAY.

WHILE attached, during the past year, in Nevada, to the U. S. Geological Exploration of the Fortieth Parallel, under Mr. Clarence King, I had a pet bird of the species known as the Arkansas Flycatcher (*Tyrannus verticalis*), which is closely related to the common Kingbird or Bee Martin in form, but differs in having the back olive gray, and the under parts yellow, except the throat, which is ashy. It is to be met with over the entire western portion of the United States, from the high plains west of the Missouri River to the Pacific, and in the vicinity of settlements is well known to every one.

Our pet, familiarly known to the party as "Chippy," was obtained about the middle of July, from the Indians, who had just taken it with three others, all fully fledged, from the nest. We carried it to our camp near by, and fed it with

*Communicated by the Smithsonian Institution.

grasshoppers and flies until he was able to catch them for himself, which he learned to do about a week after he could fly. The little fellow appeared to be always hungry, and during the day followed me about, continually teasing me for grasshoppers until he had eaten enough, after which he would remain quietly upon my shoulder, or my hat, or fly off to his favorite perch—a rope running from the top of the tent to a stake in the ground. At night "Chippy" roosted upon a rope inside the tent, or frequently under an umbrella, which, for the purpose of shading a thermometer, hung at the corner outside. When wishing to go to sleep, however, he would seldom roost in these places voluntarily, but alighting upon my shoulder would hop up close to my neck and settle cosily down, and repeated removals were necessary to induce him to remain upon the perch provided for him. In the morning as I lay wrapped in my blankets, generally the first thing that awoke me would be Chippy fluttering about my head, for he would invariably select me from the dozen persons who lay around upon the ground.

Chippy soon became a general favorite, and every one fed and caressed him. First among his many peculiarities was his almost insatiable appetite, which excited the greatest wonder and comment, and many were the conjectures as to the number of good-sized grasshoppers he could dispose of in one day. It was finally agreed that this should be settled by an experiment; each person was to keep account of all he fed Chippy, and in the evening, upon comparing notes, it was found that during the day he had made away with the almost incredible number of one hundred and twenty fat grasshoppers, all however, with their legs pulled off.

Our little pet possessed scarcely a trace of timidity, and even soon learned his own name. At least, when he was wanted we had but to call "Chippy, Chippy," and he immediately appeared, even if out of our sight, joyously twittering as he approached, and alighting upon the shoulder of the person who called him. He soon began to catch insects

himself, after I had taught him by carrying him around upon my finger and placing him up close to any fly or gnat I found perched upon the wall of the tent. When fully grown he passed most of the day sitting upon the top of the tents, occasionally darting after a passing insect, or, if the weather was particularly warm, perching upon the edge of the table, or any suitable place, under the "fly" of the tent, in the shade.

Once, when starting on horseback up the mountains after birds, at about one hundred yards from camp, I was surprised to hear Chippy coming towards me, playfully twittering, when he alighted upon my shoulder and accompanied me up the cañon. Occasionally he would leave me to catch a butterfly or other insect, upon securing which he immediately returned, alighting upon my hat, against which he beat the captive until in a condition to be swallowed. Frequently on seeing other birds of his species, he would join them, and after sporting with them awhile return to his seat upon the pummel of the saddle, my shoulder or hat, his playmates following to within a few yards, when they would stop, and perching upon a dead branch curiously watch us, wondering probably why their little friend was so fearless of me. Chippy accompanied me thus some three or four miles from camp. Having proceeded as far up the cañon as possible, I there tied and unsaddled my horse; the sun being very hot, and the bird disposed to be inactive, I placed him in the shade of my saddle. I then climbed up the hillside over the rocks, until out of sight of my horse, on my way occasionally shooting a bird, and wandering some distance from where I left Chippy; but upon my return I found him following after me, having discovered my absence by the report of my gun, and started in search of me. We then returned to camp as we had left it.

Our pet bird soon began to attract others of his species to the camp which became quite familiar. They could not, however, persuade Chippy to leave us, he evidently preferring

our society to theirs. He was at first perfectly unmindful of the report of a gun, even sitting upon my shoulder when I fired, or often perching upon the gun-barrel when I carried him with me in my rambles. One day, however, wishing to secure one of these flycatchers which flew about our camp, and intending if possible to drive them away, I shot at one of three which were sporting together in the air, thinking that Chippy was sitting upon the tent; fortunately I missed the bird I shot at, which proved to be our pet, he flying in great consternation to the camp, having probably been touched by one of the shot, although not at all injured. His disregard for a gun was now at an end, and the mere picking up of this instrument of death was sufficient to cause his immediate retreat, retiring with terror depicted upon his countenance, the feathers lying close to his body, his crest elevated and neck outstretched, removing to another perch each time I advanced. The moment, however, I laid the gun aside, all his fears were over, and upon approaching him, when I reached out my hand he would hop upon my finger with perfect confidence. Although I might carry him in this way all about the camp, if I approached the gun, which leaned against the tent, he made a precipitate retreat.

We carried Chippy with us, from camp to camp, for nearly two months longer. Everywhere we went he excited the curiosity and wonder of all persons, the Indians included, and we had not the least fear of losing him. One morning, however, in the latter part of September, we missed his familiar awakening twitter, and when we arose from our blankets he could not be found. Search was made throughout the day but without success, and a large hawk having been seen early in the morning hovering about the camp seemed to explain the cause of his disappearance. He was never afterwards seen.

WHAT IS A DESMID?

BY PROF. ARTHUR MEAD EDWARDS.

In the language of science, as put upon paper by one of its most zealous devotees, Desmids, or as they are more correctly designated, Desmidiaceæ, are "fresh-water, figured, mucous and microscopic algæ, of a green color." This author also tells us in similar language that the characteristics of these fresh-water forms are "transverse division mostly complete, but in some genera incomplete. Cells or joints of two symmetrical valves, the junction always marked by the division of the endochrome, often also by a constriction. Sporangia formed by the coupling of the cells and union of their contents."

We have here then, in brief, what a Desmid is, and now let us see if we can make this very concise, scientific and correct definition and reply to our question, plain to unscientific minds.

The difficulties attendant upon the study of these Desmids have perhaps, tended to frighten away even professed naturalists from a field of enquiry teeming with promise of results of the greatest interest and profit. At least then we have arrived at the knowledge of one fact, and that is, that a Desmid is a plant, or a member of the vegetable kingdom. This point, it is true, is all but universally acknowledged by every one who pretends to any acquaintance whatever with these creations, and therefore for the time being we will take it for granted that such is the case. In fact it is true that there is no one essential point in which they differ from the other minute plants which have been included under the designation of Protophytes; this name having been applied to them on account of the simplicity of their structure, ranking them as *first plants* in the vegetable system. But, although the name Protophyte was first bestowed for this

reason alone, there seems to be good grounds for supposing that it has been very aptly applied, for naturalists are strongly of opinion that the first forms of vegetable life which made their appearance upon the surface of the globe belonged to this group, and we see them at the present day occurring as the harbingers of more complex plants in pools and ponds, on rocks and by road-sides. The amount of study that has been bestowed upon the Desmids is really very great, but it has been by a special class of observers who have been in the habit of not trusting to the revelations of their unassisted eyes, but have called in the aid of all the contrivances of modern mechanical skill as embodied in that perfect instrument of research, the achromatic microscope. By such students we are assured that in no respect do they really approach the animal kingdom. Many arguments, it is true, have been from time to time advanced in support of their animal affinities, but these have all been determined, now that their life history and that of many other undoubted and undisputed plants have been better understood, to be but strongly indicative of their vegetable nature. But the very fact that for a long time they continued to be bandied from one kingdom to the other, now plants and then animals, only to become plants again, indicates the difficulties attendant upon their study, and the uncertain tenure with which they, even now, hold the position they by courtesy are permitted to occupy.

Ehrenberg, the great German microscopist, asserted that one of the Desmids, known by the name of Closterium, possesses true organs of motion, which it protrudes through apertures in its extremities, and keeps in continual action. Unfortunately, however, more recent investigation has revealed the fact that this statement is wanting in accuracy. No such organs of propulsion are to be seen now that we are possessed of much better microscopes than the Prussian philosopher was wont to use, therefore we can but ascribe the "feet" of his Closterium to defective methods

of observation. Many if not all of the Desmids, it is true, possess the extraordinary power of slowly changing their place, so that in time, varying with the particular forms observed, they approach the side of the bottle in which they are enclosed, upon which the most light shines, and not only so, but many appear to have a continual but steady progressive mode of motion, as when viewed by means of the microscope they are observed to traverse the field of view under the eye of the observer. Yet it cannot be said that this faculty allies them to animals, for not only do the seeds and similar parts of many plants move about in an extremely vigorous manner, but many undoubted Protophytes do so likewise. Motion is not and cannot at the present day be considered as indicative of aught else but change, physical or chemical, else might a grain of gum-camphor darting about upon the surface of a glass of water, be classed among vital organisms.

Doubtless many persons who see the question placed at the head of this article have noticed some bright pool of fresh water, by the road-side or in a field, upon a spring or summer's day, and observed that it was either filled with a seemingly gelatinous mass of light green matter, or had patches of darker green floating upon its surface. This was an indication that Protophytes or simple plants were present, and, although there are chances that such an accumulation of vegetation contains, or even entirely consists of, other organisms, yet in a number of cases hardly anything but Desmids will be there found. To collect these little wonders we have various methods suited to their mode of occurrence, and it will be well to indicate them.

First, then, they are inhabitants of fresh water, and in fact of the freshest kind of water only, decaying animal matter which would cause the water to become foul, even in a very slight degree, being sufficient to kill these tender plants and cause them to be replaced by forms of much greater simplicity. Certain brackish and marine organisms, which were

at one time supposed to belong to this family, have been since proved not to be members of it. It has been said that hardly a specimen of fresh water can be found that does not serve as the habitation of Desmids, but such is not strictly the case, although it is true that they are very widely distributed, and one intending to study them should have no difficulty in procuring specimens for examination. In clear pools, in open exposed situations, they occur in the greatest abundance, the largest species being generally found nearest the bottom. Sometimes they are to be found adhering in large quantities to some of the submerged aquatic plants that grow in such localities, forming investing films of a bright green color, which can be removed from its support, or is best gathered along with it. At other times they rest as a thick coating upon the bottom, or float in the form of a bright green scum upon the surface; but the last mode of occurrence is by no means common, the green-colored film seen so frequent upon pools not being Desmids but members of a group into which have been placed the Protococcus, Euglenia, and the so-called "Red-snow." Of these we may have something farther to say hereafter, as they are possessed of wondrous characteristics, and present subjects well worthy the study of any one having a microscope. The brownish scum which is so commonly seen in marshes and ponds does not consist of Desmids either, but is mostly made up of myriads of plants very nearly related to them, and familiarly known as Diatoms. These, again, are of extreme beauty, and at the present day hundreds of microscopes are turned towards them endeavoring to fathom their mysteries, and the optician's skill has been brought to bear upon the construction of lenses specially for the purpose of studying their life, history, and structure.

The Desmids, *Desmidieæ*, or, more correctly speaking, *Desmidiaceæ*, have had this designation applied to them from their form, that is to say, on account of their being made up of two symmetrical halves, united together by

means of a band or bridge, so to speak. They are very striking and beautiful objects when examined by means of sufficiently powerful magnifying glasses, many of them requiring for the elucidation of their structure to be amplified at least five hundred diameters, or two hundred and fifty thousand times superficially; microscopists being in the habit of speaking of the magnification of an object in diameters, that having been found to be the most convenient method of expressing the fact, the number of times which the object is amplified superficially, being, of course, formed by squaring the diameter. But a power much less than five hundred diameters, say about two hundred and fifty, is often sufficient to exhibit the general characteristics of most of the Desmids and their allies, the other Protophyta. Thus examined they present most striking objects, and at once become favorites with the amateur microscopist on account of their very marked peculiarities, great beauty, and the variety of forms which they exhibit in outline, as well as the mathematical symmetry of their markings and appendages. The most distinctive characteristic which they at once present is the bilateral structure of their so-called fronds. In the more complex water-plants, or algæ, the term frond is used to designate the whole plant, which in that case is of some degree of complexity, but here is extremely simple, and yet the same name must be made use of, as the entire individual is enclosed in one envelope and constitutes but a single cavity. As such cavities are called cells the Desmids are hence known as unicellular plants. The individual plant among the Desmids and their near relatives, the Diatoms, is often spoken of as a frustule, as the frustule of Closterium, a frustule of Navicula, these being the distinctive names given to two groups, or genera, of Desmids and Diatoms respectively. So in the organisms under consideration, the frustule is said to be a single cell, and this is shown to be the case by the fact that when a fracture takes place of the investing membrane, at any one part, the whole

contents escape therefrom. In a few instances this apparent bilateral symmetry is not so evident as in others, or even seems to be entirely absent, but on careful examination it will still be seen to be present, for the constriction in the outer coat, which is made of the substance called cellulose, may be slight or very great, cutting the individual, as it were, into two parts. External warty or spinous protuberances, or processes, are very commonly present, and then the outline of the plant is of great beauty, the green cell-contents, made up for the most part of the same material as constitutes the coloring matter of the leaves of larger plants, and there called chlorophyl, but in the Desmids known as endochrome, causing them to appear almost like brilliant gems of great purity of tint and configuration. In some cases no such external projections are present, but yet the outline of the cell is, nevertheless, extremely graceful. In the Diatoms the cell-wall is strengthened and supported by having deposited within it a mass of silicious material which then becomes marked with wonderfully fine tracings and sculpturings, but in the Desmids no such stony and indestructible substance is present, stiff cellulose only constituting the skeleton of the plant. Hence we do not find the remains of these organisms occurring fossilized in the older strata of the globe as is very commonly the case with the Diatoms. It is true that in some of the flints, hornstones and cherts, certain curious forms have been detected which have been supposed to be the remains of Desmids, but careful examination by competent authorities has tended to prove that such is not the case, but that these are most likely only the skeletons of animals very nearly allied to, if not identical with, the sponges. The true cellulose character of the cell-wall of the Desmids is proved by the action upon it of iodine assisted by sulphuric acid, in which case it is colored blue. In all cases this tough membranous material is surrounded by a perfect and distinct, although not always readily seen, sheath of a gelatinous character, which

in some cases, is very broad, but in others is extremely thin.

The outline of the Desmids, although always preserving a more or less perfect bilateral symmetry, varies very greatly. Thus in Closterium, a genus of very general distribution, and one at the same time which includes a great number of species, the general form is a round tube, more or less pointed at both ends, and with the apices both bent over in the same direction so that the individual is somewhat moon-shaped, or more like two cows' horns united base to base. When Closterium is examined with care by means of a good microscope, it is found to have its bright green cell-contents arranged longitudinally in seeming uncertain bands, which coalesce more or less, and hence are not always to be distinguished. But at the ends of the frustule are to be seen apparent organs of wondrous characters, and whose office has not as yet been determined. And the extreme minuteness of the whole plant presents great difficulties to its proper study, so that it is hardly to be wondered at that the functions of its integral parts should not be thoroughly comprehended. These seeming organs are spaces or vacuoles separated from the rest of the cell-contents, and generally of a spherical form, transparent and colorless. Within them, however, are observed numerous minute granules formed of a material of different density, as is shown by their effect upon light. And these are continually, in the healthy individual, in motion, moving about with a trembling and seemingly excited action, putting one in mind of the swarming of a crowd of bees, and hence it is often spoken of as swarming. Besides this, however, there is still another kind of motion to be seen within the Closterium cell-wall, and one at the same time perhaps of greater wonder and perplexity than that already mentioned, as the mode of motion is a problem as yet unsolved. This is the circulation or rotation of much of the liquid contents of the individual Desmid; more especially that transparent and color-

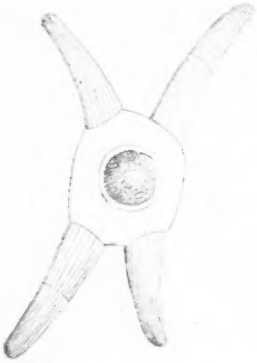
less portion which lies just within the membranous cell-wall and its lining tissue, called by the German naturalists the primordial utricle, and overlying the more solid green mass of endochrome and starchy matter; for it has been found that these wonderful little plants contain starchy matter very much after the manner of their gigantic fellows of the field and forest. Members of the genus Closterium have been found to afford the best subjects for witnessing this phenomenon, but the use of a good microscope, and a very careful arrangement of the focus of the lens, are always necessary to display it in a manner at all satisfactory. Some observers assert that they have observed this circulation of fluid, not only within the primordial utricle, but between it and the cellulose covering; however this must be a difficult thing to see, as these membranes are very closely united in most cases. Along the convex edges of the cell, when a magnifying power of about four hundred diameters is employed, it is not very difficult to see indications of this, what may be called "sap-motion" first spoken of, especially if the specimen under examination be one in a vigorous state of growth. Then there may be seen broad streams of fluid flowing over the whole surface of the endochrome, passing from the ends towards the centre and back again; and these streams seem to detach and carry with them, from time to time, little oval or globular bodies, which, on account of their action upon the light, doubtless resulting from their peculiar chemical composition, are readily seen, and any of them may be singled out and its whole course from one part of the frustule to another traced. Some observers state that these minute granules, which seem to be starchy in their composition, are thus carried on to the chambers or cavities at the end of the Closterium, and there join the bodies which are in trembling motion, as has been described; but my experience has been that such is not the case, as the number of the terminal granules does not increase, as would certainly be the case if this addition took place. On the contrary I

have often watched a single such granule caught in and carried along by the current of the flowing sap, up towards the cavity at the end, and down again towards the centre, which it reached only to again pass on up, or was arrested in its course and stopped by the way. Again I have often observed that whilst these granules were in themselves passive, and appeared to be but carried along by the stream, and were at the same time all but colorless, the uneasy little dots at the ends of the frustule were in themselves motive, and usually more or less colored, generally of a light brown tint. However this may not be always the case as we cannot, for certain, reason as to what would take place under particular circumstances in the vegetable kingdom, from what we see occurring during the prevalence of peculiar conditions. The current within individuals of Closterium, and its allied genus Penium, as they have been observed by me, would seem to be from the middle towards the ends externally, or against the primordial utricle, and then turning upon itself down again beneath or interiorly against the mass of endochrome in and along the lighter colored interspaces of that mass, which cause it to assume the coarsely banded appearance so very commonly to be seen.

One observer, named Osborne, has thought that this circulation of fluid within the Desmids—for it is by no means peculiar to Closterium or even Penium, but can be observed in several genera, although not so markedly as in these two—is caused by the waving about of little hairs, or ciliæ, as they are called, from their resemblance to eyelashes, set upon the frustule both within and without its cell-wall; but hardly any one else has been able to see any such ciliæ, and an excellent authority upon the microscope, Dr. Carpenter, says, "although the circulation is an unquestionable fact, yet I have no hesitation in regarding the appearance of ciliary action as an optical illusion due to the play of the peculiar light employed among the moving particles of the fluid; the appearance which has been thus in-

terpreted being producible at will by a particular adjustment of the illumination, but being undiscoverable when the greatest care is taken to avoid sources of fallacy." Mr. Osborne also thought he had detected external apertures in the cell-wall of Closterium, at about the locality where Ehrenberg had placed his "prehensile organs," or "feet," which, of course, were necessarily present, whilst he considered the Desmids as animals. Dr. Carpenter says with regard to this, "I must confess to a similar scepticism respecting the external apertures said by Mr. Osborne to exist at the extremities of Closterium; for whilst their existence is highly improbable on *a priori* ground, Mr. Wenham (than whom no observer is entitled to more credit) states that 'not the slightest break can be discovered in the laminated structure that the thickened ends display.'" My observations coincide exactly with those of the last gentlemen, and in fact the same is the opinion of all competent and unprejudiced observers at the present day. Most, if not all the Desmids, have the power of changing their place by sailing, slowly it is true, through the water, though not exhibiting the liveliness so evident in the Diatoms. But that they do move can be shown by shaking them up with some mud, and then covering them with water in a saucer, and placing them where the direct sunlight, or even light reflected from the sky, can fall upon the surface, when, after a time, it will be seen to become green, and the Desmids are found to have congregated at the point nearest the light; in this respect exhibiting their vegetable nature, for we know that plants love the light and will tend towards it whenever they can do so.

An individual of Closterium is represented in Plate 5, fig. 10, and the vacuoles at the ends containing the motile granules are there seen, as well as indications of the circulation of the cell-contents spoken of. The mode of growth and reproduction of the Desmids are very remarkable and of great interest, but we must leave the consideration of



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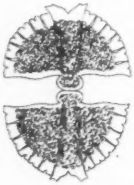

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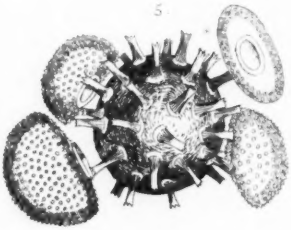

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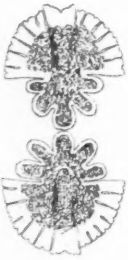

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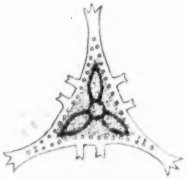

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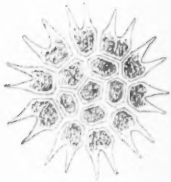

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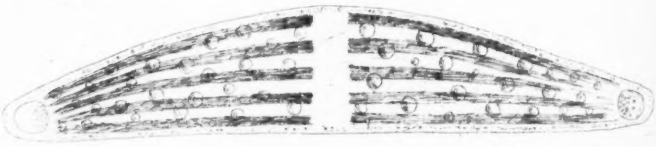

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them to some future time, only now referring to our plate, where several forms of these beautiful plants are represented illustrating the grace and symmetry exhibited in these simple organisms.

EXPLANATION OF PLATE 5.

Fig. 1. *Closterium*, conjugating.
Fig. 2. *Desmidium*, side view.
Fig. 3. *Desmidium*, front view.
Fig. 4. *Cosmarium*.
Fig. 5. *Cosmarium*, conjugating, and forming a Sporangium resembling the so called Xanthidia found in flints.
Fig. 6. *Micrasterias*, subdividing or growing.
Fig. 7. *Micrasterias*, subdividing or growing.
Fig. 8. *Staurastrum*.
Fig. 9. *Pediastrum*.
Fig. 10. *Closterium*.

REVIEWS.

THE HARRIS CORRESPONDENCE.*—Well do we remember the delight and lively interest we felt when for the first time we were allowed to look over the Harris manuscripts, after they came into the possession of the Boston Society of Natural History. There were files of letters from Curtis, Doubleday, Hentz, Leconte and Herrick, with notes from entomologists of greater celebrity, and others of lesser fame, with a number of manuscript books filled with long extracts from the works of Godart, Latreille and Olivier, in the concise and beautiful handwriting of this painstaking and precise man; copies of his own letters to his correspondents, illustrated with occasional pen and ink sketches, often of unusual fidelity and finish, of which we have fac-similes in the work before us, and three volumes of drawings, plain and colored, often made with great care,—all evidences of great industry and ability, and of the highest interest to a young naturalist away from instructors of eminence, as showing the methods of studying natural history,—being the chips, models and half-finished undertakings of a working naturalist. Such is the Harris Correspondence, and we have said nothing of the qualities of heart, the geniality, strong human sympathies and undying love of nature that crop out in the letters, published and unpublished, of one who, all in all, must rank as the first among American entomologists.

In this very attractive volume, adorned with an excellent portrait on

*Entomological Correspondence of T. W. Harris, M. D. Edited by S. H. Scudder. Occasional Papers of the Boston Society of Natural History. I. Boston, 1869. 8vo, pp. 375, $5,00. To be had of the Naturalist's Book Agency.

steel, and four steel plates of moths, caterpillars, beetles and their larvæ, with forty-six cuts in the text, we first open upon a memoir of Dr. Harris, by Col. T. W. Higginson. Then follows Harris' Correspondence with Hentz, Melsheimer, Doubleday, Herrick, Leconte, Miss Morris, and shorter communications from Say, Zimmerman, and others. An Appendix contains numerous descriptions of larvæ, republished papers, his contributions to entomology in the "New England Farmer," extracts from agricultural papers, etc., etc. The work is beautifully printed, edited with the greatest care and fidelity to the memory and fame of Dr. Harris, and is a work that every one who wishes to be an entomologist should read and reread, that he may imbibe the spirit of conscientious research and unwearying devotion to truth that were among the prime characteristics of Dr. Harris' nature.

Pictures and Stories of Animals.*—These works will unquestionably prove of benefit to the young. They are not so praiseworthy in point of composition as in the amount of information which they contain. The illustrations are most of them characteristic, while others have that stiff, woodeny appearance but too often found in works upon Natural History. The Tenney series, unlike all other juvenile works of its class, treats principally of American animals, and for that reason, if for no other, we heartily recommend it to those who would instruct their children or younger pupils in the rudiments of Natural History.

Fishing in American Waters.†—That Genial is the nature if not the exact name of the author of this most useful and entertaining volume must be apparent to every reader. Fun and fishing, tackle and tattle, pisciculture and porgies, are sandwiched together in a most delightful manner throughout the entire work. The author is evidently a Waltonian angler, an "honest man who fears God, loves his neighbor, and goes a fishing."

A fly-fisher, and, as is well known a master of that gentle art, he does not, as has been lately the fashion, "wash his hands of such dirty things" as worms, grubs and flies, and affect to despise those who use them as Goths and Vandals, but honestly acknowledges that skill may be displayed even in bait-fishing, and gives the results of his experience in that line for the benefit of those benighted heathens, who, as yet, may be totally innocent of any knowledge of the hackle, palmer, or coachman.

The Natural History department of the book is, however, to say the least, somewhat curious, as witness the following:

"I may also state my conviction that a whale is a fish, and that the porpoise is also a fish, though the members of this *genus* travel in pairs, suckle their young, of which they usually have but one at a birth, which the parent mammal guards with jealous care." (p. 25.)

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*Pictures and Stories of Animals for the Little Ones at Home. By Mrs. Sanborn Tenney. Six Vols., 12mo. Sheldon & Co., New York.

†Fishing in American Waters. By Genio C. Scott. New York: Harper & Brothers. 1869. 8vo, pp. 484.

Again (p. 41) he gives us an entirely new scientific classification of the fishes as follows: First, Mammalia!!!! Second, the genus Salmo. Third, all other oviparous fishes.

Again (p. 353), "Spallanzani proved the possibility of impregnating the eggs of *fishes* artificially. He took the eggs of a *frog* and impregnated them with the semen of a male *frog*." Surely all is fish which comes to Mr. Scott's net, Mammals and Batrachians included.

The section on Fish Culture, occupying sixty-two pages, is valuable and interesting, though written apparently more for the purpose of satisfying curiosity than of giving information to the working pisciculturist, who is anxiously looking for some work in the English language (any other will be thankfully received, but English preferred) which will give full and accurate directions for the artificial propagation of fishes. Coste, Haxo, Shaw, Boccius, Francis, Præd, Garlick, Fry, and even Norris, leave much to be desired.

Of the pictorial embellishments a great deal may be said on both sides. The grotesque initial letters are capital, the figures of fishes, taken for the most part from a well-known school-book, are very poor and by no means new; with half a dozen exceptions those in the back part of the book are intended to represent European species, and the others are with one or two exceptions, so uncharacteristic and inaccurate in detail (*e. g.*, a smelt without the adipose dorsal, p. 102, etc.), as to render the name under the cut a very important appendage. The fishing scenes are decidedly below par. On page 391 is a cut which has been going the rounds of the periodical press for the past year, and which we had hoped was, ere this, worn out. It has appeared successively in "Harper's Weekly" and "Monthly," "Scientific American," and "Phrenological Magazine." It represents a poor martyr trout in the hands of an unskilful manipulator, who holds her in such an outre manner, and squeezes her so tightly, that the eggs are forced out at the wrong way. A view of a much more humane and profitable method of handling trout may be seen on the frontispiece of "Francis' Fish Culture."

A statement like that of the capture of *Turbot* on the coast of New Brunswick (p. 432), must be taken with full allowance as to what is intended by the name of *Turbot*.

But with these exceptions, and as far as is promised, the book is the best that has yet been issued. To give instructions for fishing in American waters is what is promised in the title, and this is faithfully carried out, and to use a new and strikingly original phrase, no library of works on Angling can be complete without it. — TRUTTA.

THE MISSISSIPPI VALLEY.* — "It was with a view," the author states in his preface, "of illustrating the gradations between the forest, prairie, and desert; the varying conditions of temperature and moisture, and

*The Mississippi Valley: its Physical Geography, including sketches of the Topography, Botany, Climate, Geology, and Mineral Resources; and of the Progress of Development in Population and Material Wealth. By J. W. Foster, LL. D. Illustrated by maps and sections. Chicago: S. C. Griggs & Co. 1869. 8vo, pp. 443. $3.50.

their effects in determining the range of those plants cultivated for food; and, at the same time to trace the character of the fundamental rocks over the whole of this region, pointing out the mode of occurrence of those ores and minerals useful in the arts; and, finally to trace the colonization of this region from its feeble beginnings to its present magnificent proportions, that this work was undertaken." The author does not confine the attention of the reader to the physical features of the Mississippi Valley alone, but carries him away over the Rocky Mountains down the Pacific slope, and up the Valley of the St. Lawrence, and devotes an entire chapter to the *llanos* and pampas of South America, and the steppes and deserts of Asia, Africa, and Australia. We have in this very readable volume the most recent and comprehensive account of the Great Valley of the West that has been published in a popular form. The chapters on the origin of prairies and the geological features of the region drained by the Mississippi are exceedingly interesting, and by their clear presentation of facts, with which the author has familiarized himself while engaged upon Government surveys and in private research, are well calculated to give the general reader a good idea of the formation of our continent, and the origin of the grand features which go very far in determining the physical and moral condition of the nations dwelling on its surface.

NATURAL HISTORY MISCELLANY.

BOTANY.

TABLE-MOUNTAIN PINE.—There seems to exist such a diversity of opinion among authors in regard to the geographical range of this tree (*Pinus pungens* Michaux), that we have thought a statement as to its distribution might not be amiss.

Michaux anticipated that it would be the first of our native trees to become extinct, because its limits were so narrow and its habitat so easy of access, and so frequently swept over by fire. Nuttall tells us "its range is so wide that we have no reason to fear its extirpation." Chapman finds it on the "mountains, rarely west of the Blue Ridge, Georgia to North Carolina, and northward." In 1859, Gray limited it to "Blue Ridge, Virginia, west of Charlottesville, and southward." In 1863, he adds, on the authority of Prof. Porter, "the mountains of Pennsylvania, etc." In 1867 the same author gives a new locality near Reading, Pa., which was discovered by Thomas Meehan.

Unless we take the above statement of Prof. Porter in a pretty wide light, we have in none of these limits assigned anything like an indication as to how common the tree is in Pennsylvania. Thus far I have found it ranging from the banks of the Juniata River, in Mission County,

Pa., to Penn's Valley, in Centre County, Pa. In the latter place it is extremely common, and often forms the largest portion of the woods. The trees, too, attain a height of fifty, and perhaps I may add, not seldom sixty feet.

Mr. Hoopes, in his "Book of Evergreens," has given an admirable representation of one of the *characteristic* cones. Here I would state that the strong spine which tips each scale is subject to a most remarkable variation in size; sometimes dwindling down until it is less than in *Pinus rigida*. I have even seen this variation, from the real typical spine to the dwarfed one, on well formed scales of the same cone. We may recognize the tree usually at a glance by the persistent whorls of large cones. —J. T. Rothrock.

Variation in the Sarracenia.—Mr. Wm. H. Silsbee, of this city, has brought in from the woods in Beverly, a variety of *Sarracenia purpurea* Linn., which is worthy of notice. The modification is chiefly in color, though the size of the flower, judging from the specimen examined, is rather less than the average of the common kind. The deep purple usually seen is wholly wanting; the scape, sepals and stigma, being of a light apple green, while the petals have taken on a decided, though rather pale yellow. The leaves were not collected, and whether any change is found in them does not yet appear. This would seem a case of albinism, nearly parallel with that in *Aquilegia Canadensis* Linn., reported some years ago by Mr. G. D. Phippen, of Salem. It is an interesting question whether, in the case of deep-colored flowers like these, there is a tendency, when passing into the albino state, to stop the process at the yellow tints, as a sort of intermediate point, and not carry it forward to full whiteness. Farther observation is highly desirable; and we learn that Mr. Silsbee is acquainted with several spots where this variety of the *Sarracenia* is found.—C. M. Tracy.

Double Early Saxifrage.—This beautiful variety of the *Saxifraga Virginiensis* has been detected again by John H. Sears, in a new locality near Beverly Bridge. The panicle is smaller than in the normal form, but each flower is full-double to the very centre, the change obliterating every trace of stamen and pistil, and the blossoms remind one of those of the Queen of the Meadow (*Spiræa*), such as we see it in the gardens. —J. L. Russell, *Salem*.

Corema Conradi (Torrey).—This plant, which occurs in Newfoundland and on some of the islands off the coast of Maine, also on Cape Cod, near Plymouth, was found many years ago at Cedar Bridge, Ocean County, N. J., by Prof. S. W. Conrad, of Philadelphia. It was carefully described by Dr. Torrey in 1837 (in the Annals of the New York Lyceum of Natural History, Vol. iv, p. 83) under the name of *Empetrum Conradi*, and its New Jersey localities accurately indicated. A visit to Cedar Bridge, made in April of this year by the writer and C. F. Parker, of Camden, N. J., showed that the plant has entirely disappeared from that locality. It is said to have been also found at Pemberton Mills, N. J.,

but from that point it has been banished by agricultural encroachments. There is therefore no evidence that this species now exists south of Cape Cod, though it is possible it may again be found in New Jersey, and if anywhere in that State, probably on the wide stretch of barren, sandy dunes, a few miles west of Cedar Bridge, locally known as "The Plains," extending along the border between Burlington and Ocean Counties. Long Island should also offer some favorable points for its occurrence. —J. H. REDFIELD, *Philadelphia.*

FRAGARIA GILLMANI.—In the NATURALIST (p. 221) Judge Clinton describes a new Fragaria, from Mexico. With specimens before me, it is clearly nothing but *Fragaria vesca* Linn. *F. vesca* is a very variable plant. It is found not only all over Europe but through the whole mountain range of the American continent to the south of Mexico, and probably beyond. The higher the range the greater is the tendency to a racemose, and an "everbearing" character. I have in my herbarium specimens collected even in the comparatively low elevation of the Alleghanies in Pennsylvania, that are not in the slightest degree different from this Mexican one.

It might not be amiss to describers of species to suggest that greater attention be given to natural variations. Great evil has resulted to Botany from attributing to Horticulture so many great changes that are really but the regular developments of natural law. I have given particular attention to the strawberry for over twenty years, and am sure that "hybridization and the gardener's skill" in the production of varieties are pure imagination. The gardener has preserved, but he has not originated variations. I have not had the opportunity of examining Schleactendals' *S. Mexicana*, and some other of these so called species but from what I have gathered of the law of variation in Fragaria, and the direction of that law in the numerous forms of Fragaria that I have examined, I have little doubt that they are forms of one thing. Indeed, with the exception of *F. Indica*, there is every probability that all the species of strawberry are closely related forms of one another.

One law in strawberry development which has been of great service to me is that the "runner," or stolon, is but a modified "flower stalk," or peduncle, bearing along its course viviparous buds, instead of flowers. The grades between the forms of this one thing—that is, the vigorous runner and the floriferous scape—are beautifully illustrated by selecting the most floriferous forms (*F. semperflorens* of Duchesne), and the more vigorously running kinds (*F. Illinoensis* Gray). In *F. semperflorens* (*F. Gillmani* Clinton), the plant sometimes produces no stolons, but when it does *flowers will frequently come out at the nodes*, and the singular appearance is presented of a few single-flowered peduncles with a couple of leafy bracts, sending out roots as a living plant. When it does not produce stolons, the number of flower spikes is increased, and as they cannot "run," as a stolon, make up for this by continual axial production, bearing a succession of flowers through the whole season. By

watching a bed of seedlings from *F. Virginiana* it will be seen that there is a continual struggle going on in the *species* (regarding all the so called Fragarias as one species) as to the transformation of the runners into flowering shoots. Sometimes the runner "party" will so get the upper hand that the pistils will be entirely suppressed, in which case the runners push out with so much enthusiasm as to crowd down and frequently destroy their floriferous neighbors. In fact, just in proportion as the plant becomes truly fruit bearing, and with a tendency to produce a succession of fruit on the same stock, is the tendency to produce runners checked. But even this is subject to modification, for they may produce very short peduncles, although bearing full crops of fruit; they will in this case wait till the bearing is pretty well over and then run (Wilson's Albany), or they may produce a few long scapes, and bearing a heavy crop at once and done with it, then push out with great vigor in the running line (see New Jersey Scarlet).

The result of my observation of plants in a state of nature is, that every tribe or genus of plants has its own peculiar law of variation, that all minor variations form around this great central law, and that unless a describer of species is able to recognize this law, the time will come when he will be considered incompetent to perform his undertaking.

In describing Fragarias it will be seen that the law of variation centres in the effort to produce flower spikes out of stolons, therefore, *no character drawn from differing forms of stolons or flower-scapes can possibly serve to identify a species* in this genus.

I have thrown in these general views to excuse Judge Clinton, who, in making a new species out of an accidental variation in the cyme, has done no more than scores have done before him, and many more will in the future, without these considerations. With regard to the merits of this everbearing strawberry as a horticultural novelty I offer no opinion. The Alpine everbearing class of strawberries, however, are too much neglected. They are excellent things in the amateur's garden. There is no reason why they may not be an excellent improvement on others we have had. From the little I have seen of this "Mexican" I think it is. Therefore, though the public will not buy "a new species" they will get their money's worth as a garden fruit.*—T. Meehan.

Rare Moss.—Some rarer mosses have been detected here, of which mention may be made of *Buxbaumia aphylla* and *Tetraplodon australis*. —H. E. P., Norton, Mass.

*Since the above was in type I have seen the plants at Detroit, and they confirm what is above written. It *is* a valuable improvement on all other alpine strawberries introduced to our fruit gardens, but not botanically distinct from the well known alpine form of *F. vesca*. It is, however, interesting from the fact that what I have termed the struggle between the vivipara and the florescent principles, is much more evenly balanced in this than in any other form I have seen. The flower scapes and runners are so blended in character, that at times either partakes largely of the conditions of the other.

ZOÖLOGY.

FOOD PLANTS OF NEW ENGLAND BUTTERFLIES. — The following list of the plants upon which the larvæ of our New England butterflies are known or reasonably supposed to feed, has been drawn up after a careful examination of many authorities, and by the kind communications of several friends. In especial, we would mention Messrs. William Saunders and W. H. Edwards. To give the authorities in every instance would extend the list unnecessarily; any additions to it, or correction and confirmation of the probable food plants, would be most grateful to the author.

Papilio Asterias, cultivated and native umbelliferous plants; often found in abundance on parsley and carrots. *P. Troilus*, sassafras, spicebush, prickly ash; will eat lilac sparingly. *P. Turnus*, apple, wild thorn, choke cherry, cultivated cherry, alder, tulip, black-ash, birch, basswood, oak. *P. Philenor*, aristolochia.

Pieris oleracea, turnip, cabbage, radish, mustard. *P. rapæ*, cabbage. *P. Protodice*, cabbage.

Colias Philodice, clover, garden pea, lupine, lucerne, and other species of medicago.

Terias Lisa, *T. delia*, clover, senna.

Anthocaris Genutia, cruciferous plants.

Chrysophanus Americanus, sorrel and dock. *C. Thoe*, polygonum. *C. Epixanthe*, probably buckbean, water-dock, or some kind of sorrel; possibly cranberry.

Polyommatus Porsenna, probably arrow-wood, elder, or hawthorn.

Lycæna neglecta, cornus and willow; also Erythronium? *L. lucia*, probably the same, and perhaps buckthorn and wild lupine? *L. comyntas*, Lespedeza capitata.

Thecla Clothilde, probably species of Rubus, Genista, and Hedysarum. *T. Falacer*, hawthorn; also oak, and perhaps blackthorn? *T. strigosa*, thorn, oak, apple, willow. *T. humuli*, hop, oak. *T. Auburniana*, smilax?, red cedar? *T. Niphon*, pine. *T. Pembina*, Vicia cracca? *T. Mopsus*, wild cherry, cultivated plum, Eupatorium. *T. Augustus*, Vaccinium? *T. Henrici*, Vaccinium? *T. Acadica*, willow. *T. Scudderii*, Lupinus perennis.

Danais Erippus, different species of Asclepias; also Apocynum.

Limenitis Misippus, willow, poplar, plum. *L. Ursula*, scrub oak, gooseberry, wild cherry, Vaccinium, willow, apple, plum, quince, hawthorn, hornbeam. *L. Arthemis*, thorn. *L. Proserpina*, probably some species of Pyrus.

Argynnis Idalia, *A. Cybele*, *A. Atlantis*, *A. Aphrodite*, probably violets; some of them possibly eat Hedysarum, Polygonum, or Rubus. *A. Myrina*, wild violets and cultivated pansy. *A. Montinus*, probably violets. *A. Bellona*, probably violets; also raspberry?

Melitæa Nycteis, plantain? sunflower. *M. Harrisii*, Diplopappus umbellatus. *M. Tharos*, plantain? *M. Phaeton*, Chelone glabra, hazel; will eat black currant.

Pyrameis cardui, thistle, sunflower, hollyhock, burdock, nettle. *P. Huntera*, Gnaphalium, burdock, thistle, balsam. *P. Atalanta*, nettle, ambrosia, hop.

Junonia Cœnia, Antirrhinum, Linaria.

Vanessa Antiopa, willow, poplar, elm, balm of Gilead. *V. J-album*, hop, elm; also willow? *V. Milbertii*, nettle.

Grapta interrogationis, elm, hop, nettle, ambrosia, basswood, lime. *G. C-argenteum*, wild gooseberry, cultivated currant and blackberry, elm; probably honeysuckle. *G. comma*, hop, ambrosia, nettle. *G. gracilis*, probably nettle, ambrosia, and elm. *G. Faunus*, probably wild gooseberry, elm, and nettle.

Chionobas semidea, probably sedges; possibly lichens.

Satyrus Alope, *S. Nephele*, *S. Portlandia*, grasses and sedges.

Hipparchia Boisduvalii, grasses and sedges; probably also darnel.

Neonympha Eurytris, grasses and sedges.

Heteropterus marginatus, Lespedeza capitata.

Nisoniades Juvenalis, Glycine, Lathyrus. *N. Persius*, *N. Brizo*, Pulse family. *N. Catullus*, Monarda punctata.

Eudamus Tityrus, Robinia pseudacacia and viscosa, American Wistaria. *E. Lycidas*, Hedysarum. *E. Bathyllus*, Glycine and Hedysarum.

Hesperia Metacomet, *H. Verna*, *H. Massasoit*, probably grass. *H. Hobomok*, *H. Pocahontas*, *H. Quadaquina*, grass. *H. Leonardus*, probably grass. *H. Mystic*, *H. Sassacus*, grass. *H. Wingina*, probably grass. *H. Wamsutta*, grass. *H. Acamantus*, *H. Egeremet*, *H. Manataaqua*, probably grass. *H. Ahaton*, grass. *H. Oneko*, *H. Samoset*, *H. Vialis*, probably grass. *H. Metea*, coarse and fine grasses; probably also Panicum. *H. Manoco*, probably grass. *H. Hianna*, Glycine? grasses? *H. Panoquin*, probably grass. *H. Mesapano*, grass? *H. Delaware*, *H. Logan*, Panicum and coarse grasses.

Larvæ of unknown species of Hesperidæ have also been found on poplar, scrub oak, hazel and columbine, and Lespedeza capitata. — SAMUEL H. SCUDDER, *Boston Society of Natural History*.

TENNESSEE WARBLER. — Mr. Boardman's statement in the June number of the NATURALIST relating to the abundance of this warbler in his locality is interesting. It shows how irregular is the distribution of some of our birds. This species seems to be one of a class of birds which, though quite rare in other parts of New England, are not at all so in south-eastern Maine, reaching that region I presume via the St. Lawrence and Maine Central water route. I would here enquire if Mr. Trippe's article on "The Warblers" (NATURALIST, vol. ii.) is not written in the locality of Orange, N. J.?* On page 181 we might infer that he had been giving the Warblers of the New England States, if on a perusal of the preceding pages we had not been convinced to the contrary; the species as found by Mr. Trippe showing a decided tendency to a South Alleghanian fauna, as compared with their distribution in New England. — H. A. PURDIE, *Boston*.

*It is. — EDS.

PAPILIO (VAR?) CALVERLEYI, CAPTURED IN FLORIDA. — While in Florida last April it was my good fortune to capture a female specimen of *Papilio* var. *Calverleyi* Grote, which in some respects differs from Mr. Grote's type (a male), the description of which appeared in the "Proceedings of the Entomological Society of Philadelphia," vol. ii, and which, till now, was unique. The differences are chiefly as follows: Anterior wings wanting the yellow marginal spots; emarginations very slight; the four yellow patches nearest the internal angle suffused with orange, particularly the basal third. At the extremity of the discal cell is a conspicuous yellow band, bounded apically by the nervures. On the under side this is preceded by a small yellow spot. Apical third of the costal nervure with a fine yellow line. Secondaries with the black ground-color more encroached upon by yellow. Fulvous markings preceding the marginal lunules powdered with whitish scales; above the fulvous, and between it and the discal cell, the color is yellow. Anal ocellus pupilled with a well-defined black spot instead of a "narrow faint blackish arcuated line." Tails black without any sprinkling of yellow. Abdomen with *six rows* of yellow dots. Mr. Grote's specimen had but two rows, and *Papilio Asterias*, of which Mr. Edwards considers it a variety, has four. — THEODORE L. MEAD, *New York*.

A REMARKABLE NEW JELLY-FISH. — During an excursion to Eastport, Me., and vicinity, last season, in company with Mr. S. I. Smith and others, we discovered and captured a very large and fine new jelly-fish, rivalling in size even the common red one, *Cyanea arctica*, which it slightly resembles, and for which it might be mistaken at a distance. It is, however, more yellow in color, the large complicated ovaries hanging down below the disk being light orange, and the long frilled mouth appendages bright lemon-yellow. The tentacles are about eighty in number, arranged in a nearly continuous circle, and may extend fifteen or twenty feet in large specimens. They are also very remarkable in being flat and broad, with one edge double and divided into crenulated scallops, which are margined with white, producing a very beautiful appearance. The whole body and tentacles give a white phosphorescent light. The largest specimen was eighteen inches in diameter, and secured among the wharves of Eastport, at noon. It is remarkable that so conspicuous an animal has so long escaped observation. It belongs to a family previously unknown on this coast, and forms the type of a new genus. It was described in the July number of the "American Journal of Science" under the name of *Callinema ornata*. — A. E. VERRILL.

THE SWEDISH NORTH POLAR EXPEDITION OF 1868. — This is the fourth scientific expedition sent out by Sweden to the Arctic regions since 1858, all fruitful in results to geology and other branches of science. After a thorough exploration of Beeren Island on the way, Ice fjord in Spitzbergen, was reached on the thirty-first of July. Ice had already been met with at South Cape, and it increased as they approached the Thousand Isles. The intention was to pass to the eastward of Spitzbergen, but the

ice rendered this impracticable. The geology of Ice fjord was carefully explored during the stay here, and the important discovery made of post-tertiary strata containing fragments of plants and shells now found living much farther south in Norway. It was estimated that 2000 or 3000 head of walrus were annually slaughtered in Spitzbergen by Norwegian walrus-hunters, showing that there must be a large tract of meadow land free from ice to sustain so large a number of these animals, unless they travel over from Nova Zembla. They then endeavored to penetrate to Greenland along the eightieth parallel of latitude, but impenetrable masses of ice, tending north-east and south-west, rendered this impassable. Turning then to north and north-east, they reached 81° 16′ north latitude. Here the ocean was sometimes covered with a thin coating of ice, and the old ice northward was quite impassable, the temperature sinking to 21° F. On the 29th of August the "Sofia" entered Liebde Bay, in Northern Spitzbergen. The deep-sea soundings revealed the interesting fact that Spitzbergen was connected with Scandinavia by a submarine bank, having a *maximum* depth of three hundred fathoms. North and west of Spitzbergen the sea deepens to 2000 fathoms and more. At the greatest depths animal life was found. At 2600 fathoms Foraminifera were brought up. Liebde Bay was now for the first time explored, both in its topography and geology; its climate was mild and calm, while out at sea high winds and snow storms prevailed. After a vain attempt to reach Gilles' Land, the "Sofia," on the 16th of September, made a final endeavor to penetrate the ice to the northward, succeeding at length in reaching 81° 42′, the highest point probably yet reached by a vessel, Scoreby's farthest (in 1806) being 81° 30′; and Parry's (in 1827) 81° 6′; but Parry, in sledges on the ice, reached 82° 45′. The ice to the northward of this was broken, but so closely packed that not even a boat could pass forward, and farther westward (on the meridian of Greenwich) the limit of this impenetrable ice came down to 79°. At night the vessel lay to beside the larger sheets of ice, but the temperature having sunk to 16° F., the risk was run of finding themselves blocked up in the morning. After returning to Spitzbergen, and leaving letters announcing their intentions, they made another last push for the north on the 1st of October, but when in latitude 81° all farther endeavors were put a stop to by a collision with an ice block, which opened a large leak in the vessel's side. With great difficulty they regained the land, the water standing two feet over the cabin floor. The intention of wintering here was then abandoned, and the "Sofia" returned to Norway.—*Scientific Opinion.*

Note on the "Blowing" of Whales.—The celebrated Norwegian naturalist, M. Sars, was the first, or one of the first, to assert that whales when "blowing" did not throw up water into the air, unless the "blow-hole" was beneath the surface. The popular idea has been, and is opposed to this. While cruising in the North Pacific, and Behring's Sea, I paid particular attention to this point. I was very fortunate in seeing

many whales at close quarters, particularly a small species known as the "blackfish," which often played around the vessel all day, sometimes not ten feet from her hull. I observed that while no water, or only a very minute quantity, was ejected when the "blow-hole" was out of water, still the air ejected had an appearance like one's breath on a cold day, somewhat like vapor. Sometimes when very close I fancied I perceived a disagreeable odor. On mentioning this to the captain, an old whaler, he informed me that the vapor ejected by the sperm whale was so fetid as to nauseate any one immediately who was unused to it; that he had been so affected himself when he first went a whaling, and also that the mucus sometimes thrown out when "blowing," is commonly believed by whalers to raise a blister, if it comes in contact with the skin. Cannot some of our New Bedford friends add to our information on these subjects?—W. H. DALL.

While on a voyage to Labrador in 1864, we had good opportunities of observing the spouting of whales, the stream of vapor issuing from the blow-hole, and immediately disappearing. As we stated in the "Proceedings of the Boston Society of Natural History," for 1866, the three genera of whales we observed, *i. e.*, the Sperm, Finner and Hump-back, "can be easily distinguished by the differences in the stream of vapor spouted out when the animal comes to the surface to breathe. Thus, according to my informant, Capt. I. Handy, an experienced whale fisherman, and a very accurate observer, the 'spout' of the sperm whale issues in a single short stream of vapor from the extreme end of the nose, and curls over in front of the head. The spout of the Fin-back forms a single column of vapor about ten feet high. The Right and Hump-back, and Sulphur-bottom, all 'blow' in a double stream, which is directed backwards, towards the tail."—A. S. P.

THE MOTTLED OWL AGAIN.—I noticed in the September number (vol. ii) of the NATURALIST a communication from Dr. Wood, concerning the Mottled Owl, in which he rather leans to the opinion that the Red and Gray Owls are different birds, and in the August number a note from Mr. Allen, who evidently considers them one and the same bird, subject, however, to variations of plumage. The latter conclusion is, I am convinced, the true one, but as the matter does not seem to be quite cleared up, I would like to send you a few observations of my own that may serve to throw some light on the subject.

On the 30th of May last I found a nest of the Mottled Owl, in an apple tree, at Concord, Mass., containing four young birds (apparently about two weeks old) and their mother. Although but few feathers had begun to appear on the young their coloring was nevertheless very apparent; two were *red*, the remaining two *gray;* the mother was red. Selecting a red and gray owl from the young brood I replaced the others in the nest, and started for home with my prize. For the next two or three weeks they grew apace, feeding greedily upon meat of all kinds, giving, however, a decided preference for small birds, which they soon learned to tear up for themselves. While I was absent in August, the person to whose

care they were entrusted, becoming tired of her charge, turned them out of the cage in which they had thus far been kept. At first they seemed to exult in their new-found freedom, keeping away from the house, and during the greater part of the night answering one another from the trees in the garden, but after a trial of several days, finding themselves unable to procure food, they came back and ventured by degrees into the kitchen, where they were well received and fed, and after that they regularly returned with the twilight, entering through an open window or door, and after flying noiselessly about the room, settling on the edge of a table, or the back of a chair. Early in September they moulted, and in their second plumage still retained their distinguishing colors. They remained with us till the latter part of October, when they both suddenly disappeared. — WILLIAM BREWSTER, *Cambridge, Mass.*

PROCEEDINGS OF SCIENTIFIC SOCIETIES.

THE SALEM MEETING OF THE AMERICAN ASSOCIATION. — It is a sudden transition from the lake and prairie scenery about the great city of Chicago, where the Association held its meetings last year, to the small and quiet City of Peace, resting between the rock-bound coasts of Nahant and Cape Ann, with its picturesque environs and pleasant beaches at Beverly, Swampscot and Nahant. From present appearances the meeting will be largely attended, and the sessions prove at least of the usual interest. As various short excursions about Essex County are projected we give a brief sketch of the physical features of the vicinity of Salem. The soil is underlaid by gneiss rocks, with trap and granite overflows, forming picturesque hills and knolls, of which the highest in the immediate vicinity of Salem is Legg's Hill, about a mile south of the city, from which a good view of the harbors of Salem and Boston, and the Cape Ann shore can be obtained. The trap eruptions prevail through Swampscot, Marblehead and about Salem, rising abruptly into irregular knolls and bosses, with salt marshes or upland clays and gravels stretching away from their base. Along the shore, often very precipitous and broken by caves and fissures, are seen fine exposures of trap dykes and intrusive masses of sienite, indicating in some cases several successive eruptions; the sienites thus injected being often changed into a peculiar greenish or reddish jasper, many pebbles of which are found in the pudding-stone about Roxbury. The age of these rocks is not yet definitely known, and the question of their age and that of the igneous rocks accompanying them, and their relation to the beds of conglomerate about Boston, and the Lower Silurian rocks at Braintree, renders the geology of Essex and Sussex County a most difficult, though extremely interesting study, and one as yet but hardly touched upon by

geologists. Going from Lower Silurian rocks to the clays and gravels of the Quaternary Period, which immediately overlie them, we find these beds resting upon gneiss rocks polished and scratched, often with great distinctness, as upon a hill in North Salem at Dr. W. Mack's summer residence; in Boston Street in Salem; a mile from Salem towards Lynn, on the top of a hill; the scratches all running in a general north-west and south-east direction. Among the many gigantic boulders transported on the backs of the continental glaciers of the early glacial epoch is the famous ship-rock in Danvers. The brickyard clays, which graduate into the earthy clays composing most of the arable lands of the County of Essex, and in which fossils have only been found at Chelsea and Gloucester, are overlaid by thick beds of gravel and sand, which have been rearranged into terraces along the rivers, and on the seaboard into raised sea beaches, which can be readily distinguished on the line of the Eastern Railroad, especially in Chelsea and Somerville. At Andover, among the hillocks of sand forming the "moraine terrace" of Professor Hitchcock, which border the Merrimac, is the celebrated "horse-back," called "Indian Ridge,"—that puzzle in Quaternary geology. The student of ethnology and anthropology can investigate the Indian shell-heaps, or Kjœkken-mœddings found along the whole coast, containing pieces of pottery, arrowheads, and bones of various animals, especially at Ipswich and on Plum Island, and many other points, specimens of which are on exhibition in the Museum of the Peabody Academy of Science. The inland zoölogist will eagerly explore the rocks and tidal pools and beaches, for the living representatives of animals he has before known only by the remains in palæozoic rocks; and the botanist will find in the sea-weeds thrown up on the beaches, and in the diatoms of the brackish waters, and the meeting of Northern and Southern plants in the woods and skirting the coast, much of interest.

ANSWERS TO CORRESPONDENTS.

W. C. G., Poughkeepsie, N. Y.—We have often noticed these erosions in the crust of the lichen, *Gyrostomum urciolatum* Tuckerman, and think that they are made by the rasping tongue of some Helix or Limax, if not by the larvæ of the Microlepidoptera. The whitish substance removed revealing the reddish bark beneath, is the thallus of the lichen, and the open papillæ are the apothecia.—J. L. R.

W. C. F., Sandwich, Mass.—The larvæ you send (May 17) are those of an apparently undescribed species of *Grapholitha*, a Tortricid, or leaf-rolling moth. We had noticed them May 15th, on the apple, and a day later perforating the half-expanded leaf and flower buds of the apple, pear and cherry, on which they were very abundant, and when the leaves were partially expanded they had folded the leaf. Other larvæ are half-grown. It appears on the trees just as the canker-worm is hatched out, as we observed them between the 10th and 15th of May this season. On June 1st they were abundant and doing considerable harm, and about pupating. They remain about two weeks in the cocoon before assuming the chrysalis state and are now (July 1st) flying about the garden and entering our windows, attracted by the light. This is a very injurious insect and new to our gardeners, and has done considerable damage in the vicinity of Salem.

BOOKS RECEIVED.

Journal of Fish-rearing and Aquiculture. Edited by Dr. A. J. Malmgren. Vol. i, No. 1. May. 1869. Helsingfors, 1869. 8vo, pp. 96.

The Field. February 27, March 20, April 3, May 1. London.